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Appendix A

Monitored Data

This appendix presents the 8-hour ozone 4th high values from monitored ozone data and calculations for all sites in the Midcoast Nonattainment Area

All data and calculations meet the criteria for data handling contained in EPA's December 1998 "Guideline on Data Handling Conventions for the 8-Hour Ozone NAAQS." For this analysis, the most significant of these data handling conventions are:

- A valid ozone monitoring day consists of 'at least 18 out of 24 possible 8-hour averaging periods' unless 'the daily maximum 8-hour average concentration for the day is greater than 0.08 ppm.'
- 'A valid year must have valid 8-hour daily maximum ozone concentrations for at least 75% of the required monitoring days in the ozone season' unless the 4th high value is greater than 0.08 ppm.
- For purposes of determining attainment status, 'all three years must average at least 90% 0.08 ppm then years with less than 75% data recovery are included in the calculations.

Design values are calculated by taking the average of 3 consecutive years' 4th high values (which meet the data handling conventions sited above). The year cited for the design value is the final year of the 3-year average.

Table A-1 contains data for the current Midcoast Nonattainment Area since 1983. The data includes the 4th high value for each year, the valid design value and recovery rates both for individual years and 2006 threshold values.

Threshold values are the 4th high value needed in 2006 to cause the design value calculation to exceed the ozone NAAQS Threshold values help to determine the likelihood of a given site/area meeting (or exceeding) the ozone NAAQS in the following ozone season. Table A-1 clearly demonstrates that the Midcoast Nonattainment Area's monitored 4th high values have not exceeded the current thresholds for 2006 since 2002 (4th high values that exceed the threshold are colored orange). Therefore, the Midcoast Nonattainment Area is more likely to maintain a redesignated attainment status than not.

Table A-1 4[th] high values, design values, recovery rates and threshold analysis for each site in the Midcoast nonattainment area.

MONITOR	8-HR OZONE PARAMETER	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
KNOX COUNTY																	
Port Clyde	VALID 4TH HIGH						[illegible]	96	99	[illegible]	93	88	85	90	81	80	77
Port Clyde 23-013-0004	SEASON RECOVERY RATE					74%	97%	95%	85%	95%	97%	98%	93%	94%	98%	96%	99%
Port Clyde 23-013-0004	VALID DESIGN VALUE					***	***	108	105	102	101	97	88	87	85	87	82
Port Clyde 23-013-0004	3-YR RECOVERY RATE					***	---	88%	92%	92%	93%	87%	96%	95%	95%	96%	98%
Isle Au Haut	VALID 4TH HIGH								87	115	86	81	81				
Isle Au Haut 23-013-0003	SEASON RECOVERY RATE				45%	57%	60%	61%	76%	77%	99%	86%	85%				
Isle Au Haut 23-013-0003	VALID DESIGN VALUE				***	***	103	108	98	96	98	94	82				
Isle Au Haut 23-013-0003	3-YR RECOVERY RATE				---	---	54%	59%	65%	71%	84%	86%	91%				
HANCOCK COUNTY																	
ANP McFarland Hill 0003	VALID 4TH HIGH	91	89	84	83	94	114										
ANP McFarland Hill 23-009-0003	SEASON RECOVERY RATE	91%	85%	97%	94%	95%	91%										
ANP McFarland Hill 23-009-0003	VALID DESIGN VALUE	***	***	88	85	87	97										
ANP McFarland Hill 23-009-0003	3-YR RECOVERY RATE	***	***	91%	92%	95%	93%										
ANP McFarland Hill 0101	VALID 4TH HIGH							76	89			80	75	92	73	77	
ANP McFarland Hill 23-009-0101	SEASON RECOVERY RATE							91%	93%	71%	56%	97%	87%	99%	99%	98%	
ANP McFarland Hill 23-009-0101	VALID DESIGN VALUE							***	***	86	88	85	***	82	80	80	
ANP McFarland Hill 23-009-0101	3-YR RECOVERY RATE							---	***	85%	73%	75%	80%	94%	95%	99%	
ANP McFarland Hill 0103	VALID 4TH HIGH																88
ANP McFarland Hill 23-009-0103	SEASON RECOVERY RATE																98%
ANP McFarland Hill 23-009-0103	VALID DESIGN VALUE																---
ANP McFarland Hill 23-009-0103	3-YR RECOVERY RATE																---
ANP Cadillac Mt	VALID 4TH HIGH														82	85	[illegible]
ANP Cadillac Mt 23-009-0102	SEASON RECOVERY RATE													37%	81%	79%	93%
ANP Cadillac Mt 23-009-0102	VALID DESIGN VALUE													***	***	***	87
ANP Cadillac Mt 23-009-0102	3-YR RECOVERY RATE													***	***	66%	85%
MID COAST NONATTAINMENT AREA	4TH HIGH MAX	98	94	98	83	94	122	96	99	115	93	86	85	92	82	90	94
MID COAST NONATTAINMENT AREA	DESIGN VALUE MAX			88	85	87	103	108	105	102	101	97	88	87	85	87	87

Table A-1 continued 4th high values, design values, recovery rates and threshold analysis for each site in the Midcoast nonattainment area.

MONITOR	8-HR OZONE PARAMETER	2000	2001	2002	2003	2004	2005	ACTIVE Monitors 2006 THRESHOLD	Historical exceedance % of the 2006 Threshold	last 10 years exceedance of the 2006 Threshold
KNOX COUNTY										
Port Clyde	VALID 4TH HIGH	70	91	88	82	74	75	106	11 1%	0 0%
Port Clyde 23-013-0004	SEASON RECOVERY RATE	98%	100%	89%	92%	98%	88%			
Port Clyde 23-013-0004	VALID DESIGN VALUE	76	80	83	87	81	77			
Port Clyde 23-013-0004	3-YR RECOVERY RATE	99%	99%	96%	94%	93%	93%			
Isle Au Haut	VALID 4TH HIGH									
Isle Au Haut 23-013-0003	SEASON RECOVERY RATE									
Isle Au Haut 23-013-0003	VALID DESIGN VALUE									
Isle Au Haut 23-013-0003	3-YR RECOVERY RATE									
HANCOCK COUNTY										
ANP McFarland Hill 0003	VALID 4TH HIGH									
ANP McFarland Hill 23-009-0003	SEASON RECOVERY RATE									
ANP McFarland Hill 23-009-0003	VALID DESIGN VALUE									
ANP McFarland Hill 23-009-0003	3-YR RECOVERY RATE									
ANP McFarland Hill 0101	VALID 4TH HIGH									
ANP McFarland Hill 23-009-0101	SEASON RECOVERY RATE									
ANP McFarland Hill 23-009-0101	VALID DESIGN VALUE									
ANP McFarland Hill 23-009-0101	3-YR RECOVERY RATE									
ANP McFarland Hill 0103	VALID 4TH HIGH	70	94	89	80	73	74	103	0 0%	0 0%
ANP McFarland Hill 23-009-0103	SEASON RECOVERY RATE	100%	99%	94%	99%	99%	97%			
ANP McFarland Hill 23-009-0103	VALID DESIGN VALUE	83	85	84	87	80	76			
ANP McFarland Hill 23-009-0103	3-YR RECOVERY RATE	99%	99%	98%	97%	97%	98%			
ANP Cadillac Mt	VALID 4TH HIGH	78	[illegible]	[illegible]	83	82	83	90	40 0%	40 0%
ANP Cadillac Mt 23-009-0102	SEASON RECOVERY RATE	97%	84%	97%	99%	94%	98%			
ANP Cadillac Mt 23-009-0102	VALID DESIGN VALUE	87	89	93	94	86	82			
ANP Cadillac Mt 23-009-0102	3-YR RECOVERY RATE	94%	91%	93%	93%	97%	97%			
MID COAST NONATTAINMENT AREA	4TH HIGH MAX	78	101	100	83	82	83			
MID COAST NONATTAINMENT AREA	DESIGN VALUE MAX	87	89	93	94	86	82			

Appendix B

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Chemical Analysis

Photochemical assessment monitoring station (PAMS) sites monitor chemicals associated with ozone formation, ozone and meteorological data. The data from sites in Maine and Massachusetts has been analyzed by MEDEP staff meteorologists. Massachusetts sites were included because they are upwind of Maine The meteorological portion of the analysis is presented in Appendix C

BACKGROUND INFORMATION:

The Clean Air Act Amendments of 1990 required EPA to promulgate regulations for the "enhanced" monitoring of ozone and its precursors for ozone nonattainment areas classified as serious, severe or extreme. Both Congress and EPA recognized the need for an improved understanding of the ozone problem, and better feedback mechanisms for evaluating the effectiveness of ozone control strategies. In 1993, EPA published the final rule detailing the minimum requirements for PAMS, which includes measurements of nitrogen oxides (NOx), speciated volatile organic compounds (VOCs), and meteorological parameters. These monitoring regulations provide for the collection of an "enhanced" ambient air quality database which can be used to better characterize the nature and extent of the ozone problem, aid in tracking VOC and NOx emission inventory reductions, assess air quality trends, make attainment/nonattainment decisions, and evaluate photochemical grid-model performance.

There are four different types of PAMS sites, each serving a specific monitoring purpose: a Type 1 is upwind of the urban area and represents background concentrations coming into the area, a Type 2 is on the downwind fringe of the urban area and represents maximum precursor concentrations from the area; a Type 3 is located in an area with maximum ozone concentrations; and a Type 4 is at extreme downwind location to represent long-range transport from the area. Therefore, PAMS sites required for an area will not necessarily all be located within the boundaries of the non-attainment area Thus Maine, with no serious, severe or extreme non-attainment areas itself, has three PAMS sites in operation.

Figure B-1 displays the sites included within the analysis · The number following each site name indicates the type of site it is while the color of the circle indicates the area it is related to. There are no Type 1 sites included within the analysis.

The distinguishing features that make PAMS sites truly "enhanced" ozone monitoring stations is that they collect meteorological, ozone and its precursors (oxides of nitrogen and VOCs) data simultaneously. Gaining a better understanding of how these variables interact with each other in actual real-world instances is necessary in order to effectively address Maine's and the nation's continuing ozone problem.

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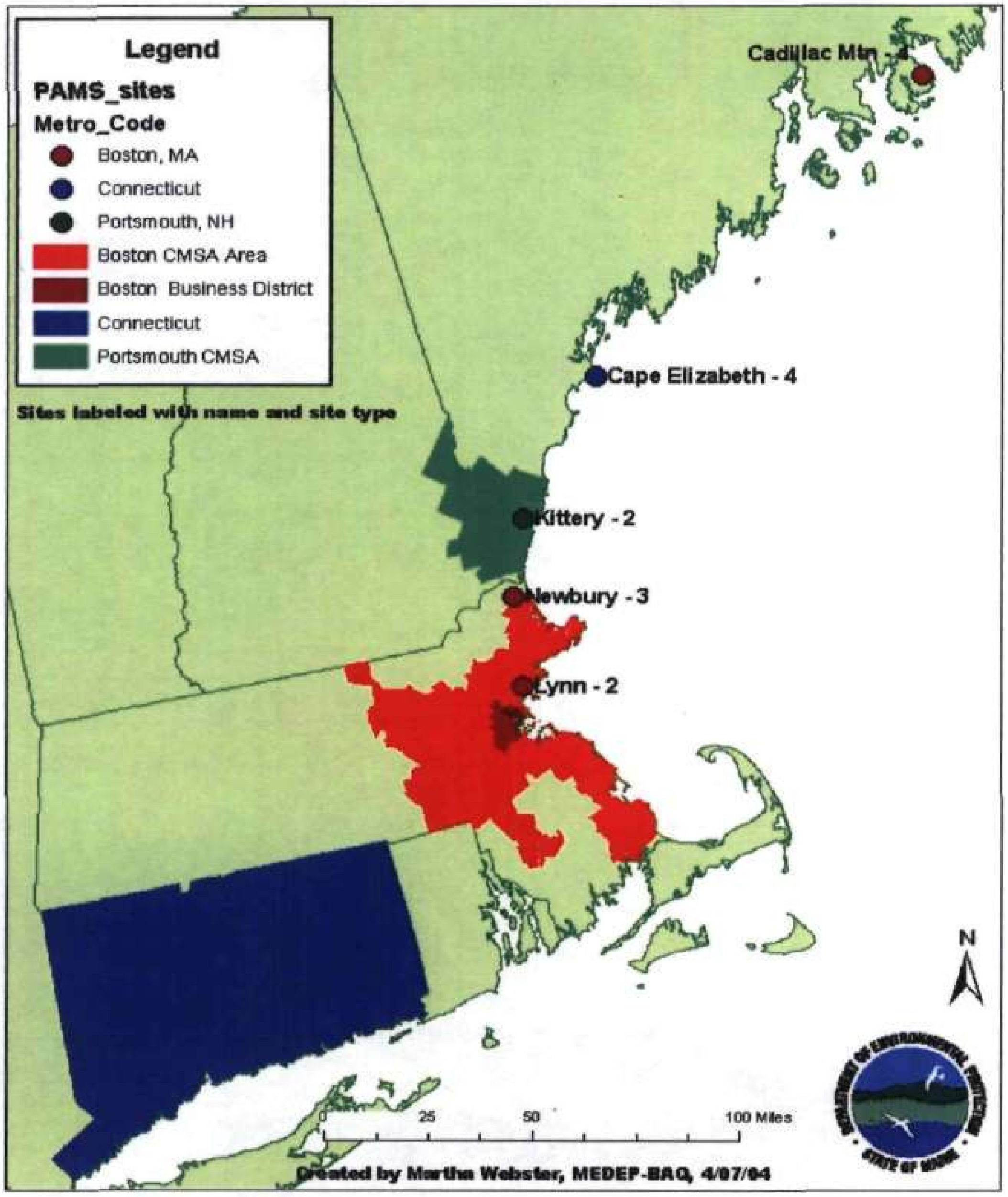
Figure B-1



ANALYSIS DESCRIPTION:

There are five sites within the geographical region of study; Kittery, Cape Elizabeth, Cadillac Mountain, Newbury and Lynn are in Massachusetts. The sites are listed below along with the years of data used in the analysis and the state agency responsible for maintaining the site.

- Top of CADILLAC MOUNTAIN, Maine
  - 1995-2004 data downloaded from AQS

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- site operator - MEDEP
- CAPE ELIZABETH, Maine
  - 1993-2004 data downloaded from AQS
  - site operator - MEDEP
- KITTERY, Maine
  - 1995-2003 data downloaded from AQS
  - site operator - NHDES
  - some data from this site is questionable and therefore not included in every aspect of the analysis
- NEWBURY, Massachusetts
  - 1994-2003 data downloaded from AQS
  - site operator - MADEP
- LYNN, Massachusetts
  - 1993-2003 data downloaded from AQS
  - site operator - MADEP

Analysis of the wealth of data is extensive and ongoing. Only the most pertinent graphs are included herein. Listed below is a sampling of the extent of the analysis:

- PAMS Season (June 1 to August 31) Data Summary Statistics for all 5 sites
  - averages and maximums for all compounds
  - data recovery rates
  - % of data below minimum detect levels (MDL)
  - 50th, 70th and 90th Percentiles
- Plots
  - 1993-2004 event averaged plots for all compounds (5-sites plotted)
  - 1997-2003 and 1997-2002 event averaged plots for all compounds (5-sites plotted)
  - Multi-year PAMS season hourly plots for all compounds (1-site plotted)
  - Ozone pollution roses averaged for all 1993-2004 PAMS season hours > 64ppb, >81ppb
- MAP
  - Elevated 1-hr avg Ozone concentration (>64ppb and >81ppb) wind direction frequencies (all data @ 5 sites) (found in Appendix C)

The compounds of greatest pertinence to ozone are oxides of nitrogen (NOx), PAMS target compounds (PAMHC) and total non-methane organic carbons (TNMOC). The trends of these focus compounds are displayed in Figures B-2 through B-4. For the Midcoast Nonattainment Area and sites upwind these compounds are lower in recent years than levels in the late 1990's so the area is not likely to exceed the ozone NAAQS in the future.

Figure B-2

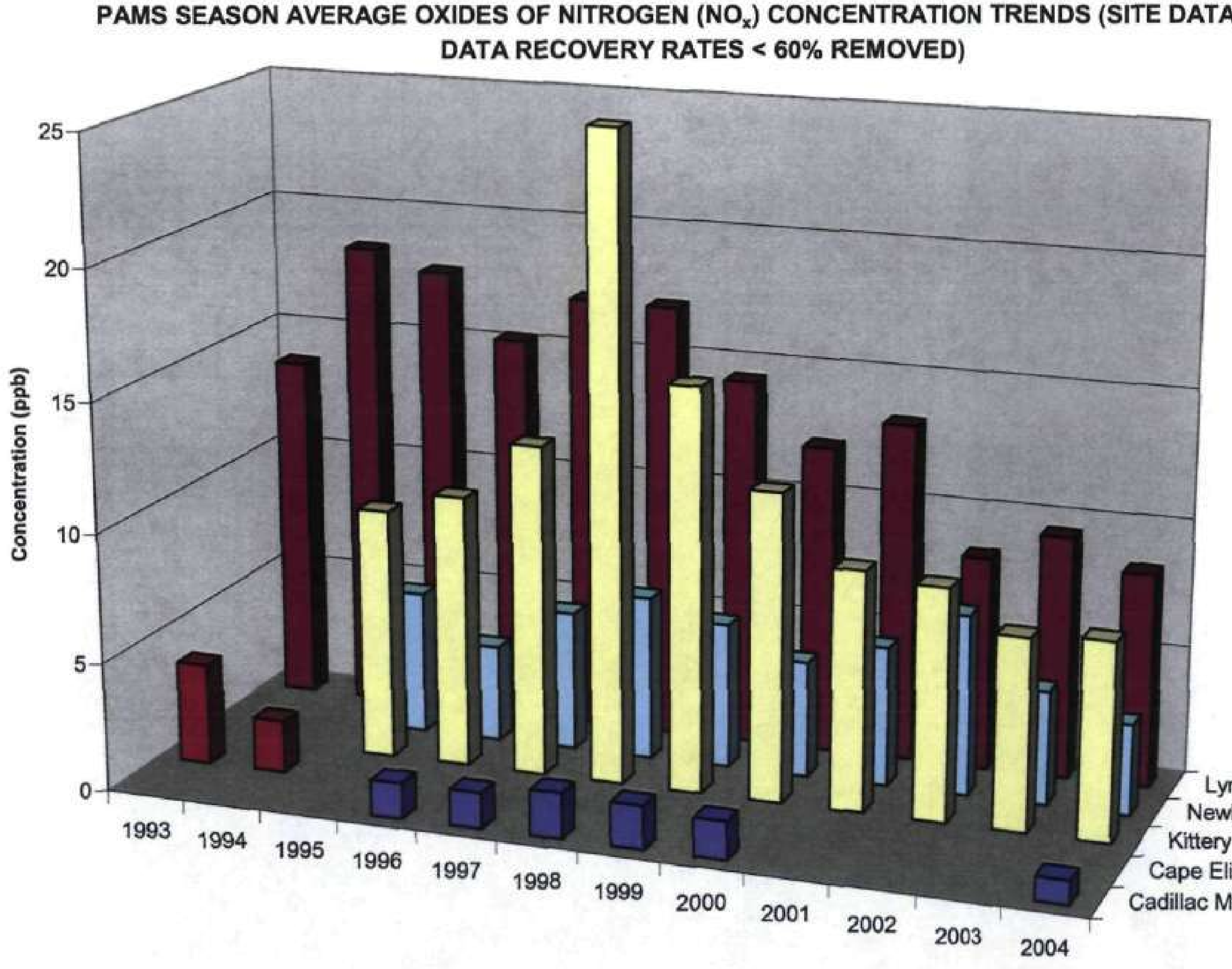

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Figure B-3

PAMS SEASON AVERAGE SUM OF PAMS TARGET COMPOUNDS (PAMHC) CONCENTRATION TRENDS and 2000-2003 KIT DATA REMOVED; SITE DATA WITH DATA RECOVERY RATES < 60% REMOVED

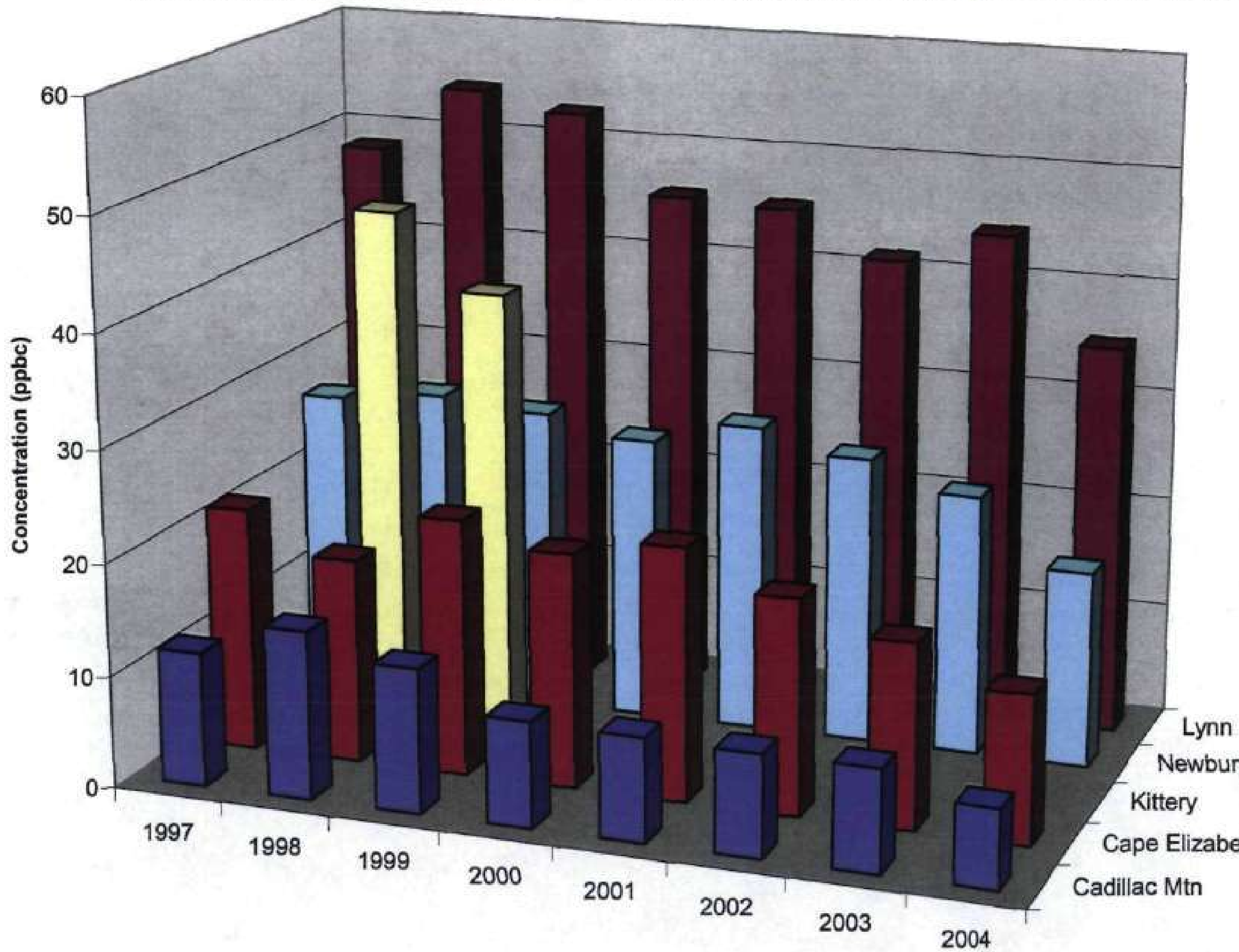
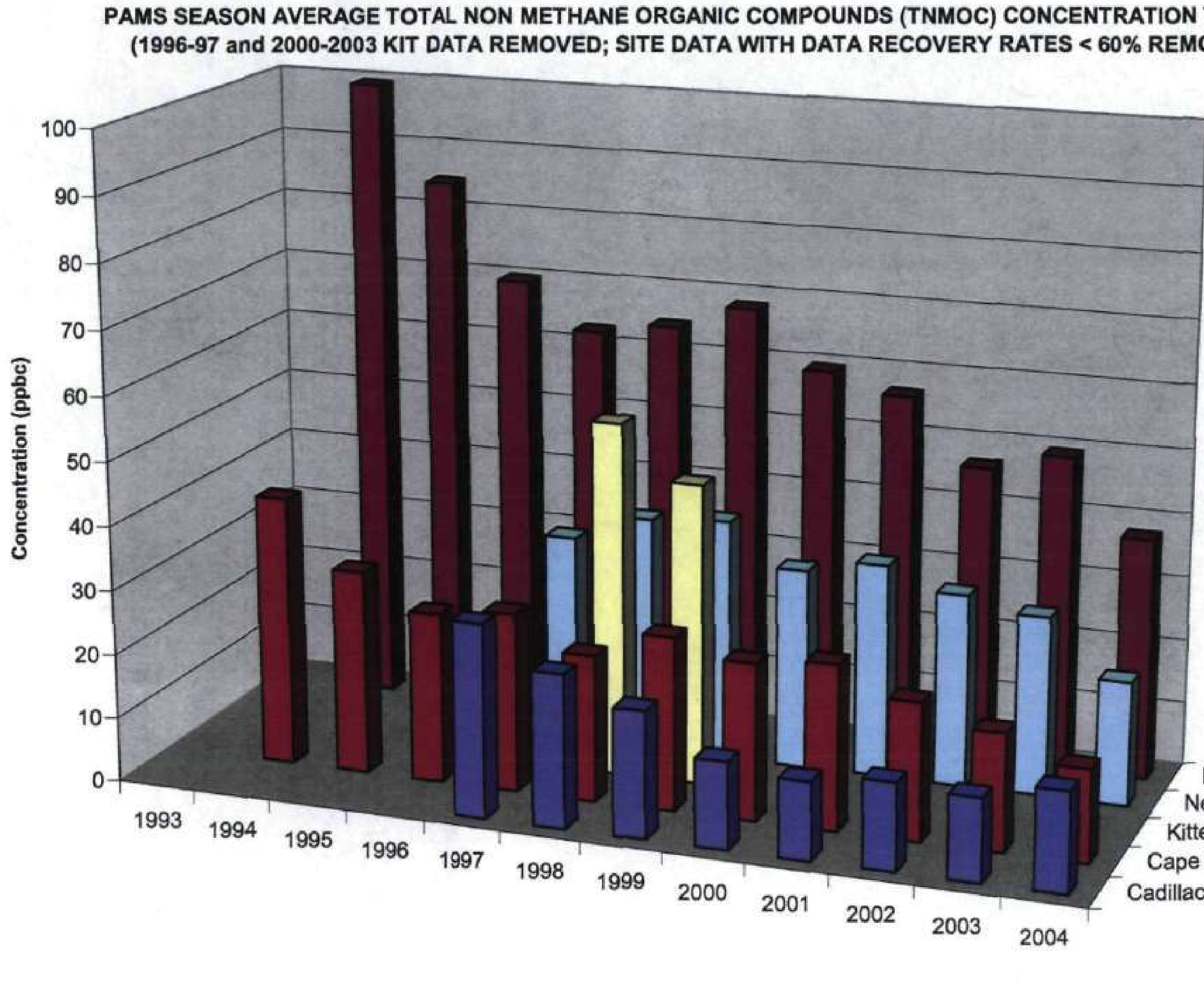


Figure B-4


PAMS SEASON AVERAGE TOTAL NON METHANE ORGANIC COMPOUNDS (TNMOC) CONCENTRATION
(1996-97 and 2000-2003 KIT DATA REMOVED; SITE DATA WITH DATA RECOVERY RATES < 60% REM
Concentration (ppbc)
100
90
80
70
60
50
40
30
20
10
0
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
Kitt
Cape
Cadillac

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Appendix C

Meteorological Data Analyses

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Executive Summary of the Meteorological Analyses

Meteorology is a major factor in the formation and transport of ozone and its precursors. High ozone concentrations in southern Maine occur most often when low pressure systems approach from the Great Lakes or southern Canada while high pressure is situated just off the eastern seaboard. When such a scenario is in place, it provides warm temperatures, clear skies, and southwesterly winds to allow the transport of precursors into the Northeast.

These meteorological data analyses illustrate that exceedance days in Maine occur when the surface wind has a southwesterly component along with a westerly wind component at the 850 mb level. These directions indicate that ozone and its precursors are transported from larger metropolitan areas into the Midcoast area on exceedance days. These conclusions have been well-known and documented for years.

Historically, ozone levels have exceeded the standard even during marginally favorable transport conditions. As ozone precursors are reduced, through a variety of point, area and mobile source controls, wind direction becomes a more critical factor for ozone buildup in Maine. Thus, Maine now requires a 'direct hit' of ozone and precursors from large urban areas to cause ozone exceedances.

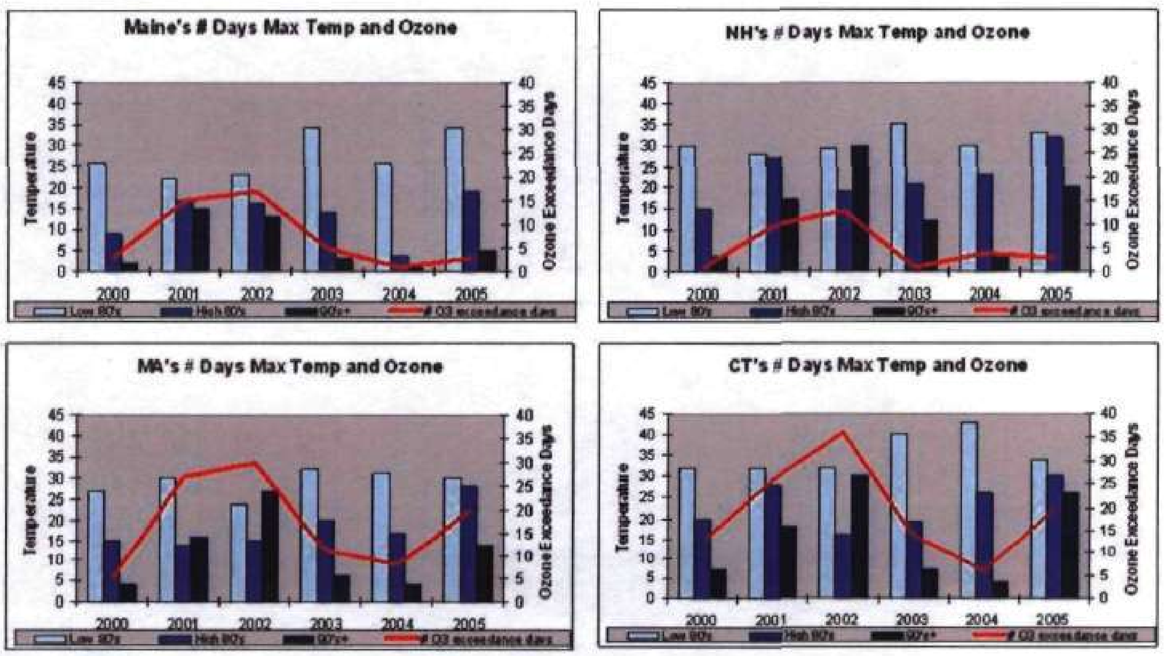
In the event that meteorological conditions during future summers again favor transport to Maine, ozone levels in the Midcoast Nonattainment Area are less likely to exceed the standard due to the fact that the NOx SIP call and other emission control programs have reduced emissions of NOx and VOC in the region.

Even though temperatures during the peak of the 2005 Ozone season were above normal, ozone levels in Maine were similar to the cooler summers of 1996, 2000, 2003 and 2004. This was a result of reduced ozone and precursors available to be transported to Maine along with less favorable transport conditions. There has been a clear decline in the number of ozone exceedances in Maine over the last 17 years. Thus, monitored attainment of the Midcoast Nonattainment Area is not primarily due to unusual meteorological conditions.

Regional Temperature Versus Ozone Graphs

Since ozone exceedances are typically associated with hot sunny summer days, Maine Department of Environmental Protection's Bureau of Air Quality (MEDEP-BAQ) staff meteorologists thought it might be useful to look at graphs of temperature versus ozone in New England. Maximum daily temperature data for Hartford, Connecticut; Worcester and Boston, Massachusetts; Manchester, New Hampshire; as well as Augusta and Bangor, Maine was downloaded from the National Weather Service's web site for the months of April through September for 2000 to 2005. With the exception of Boston, the cities chosen were major cities unaffected by sea breezes. Formulas were then written to count the number of days during each year's ozone season that the maximum daily temperature fell into a given range. In Figure C-1, these counts are represented by the blue shaded bars. Next the number of ozone exceedances days that occurred within that state for each year is graphed using a red line. The scale of these graphs is consistent for each state so that quick comparisons can be made.

Figure C-1 Temperature vs Ozone



By viewing these charts together, the differences between northern and southern New England become apparent. The summer of 2005 was warmer than the two preceding summers across the region and there were an increased number of ozone exceedances recorded by every state. However, it is also apparent that the number of ozone exceedances was considerably fewer for the northern New England states both compared with the southern New England states and also with the previous high years of 2001 and 2002. Thus, hot sunny days are not the sole factor for ozone exceedances in northern New England or more specifically, Maine. These charts also illustrate that even for southern New England the number of exceedances was lower than the high years of 2001 and 2002 even though the number of hot days was greater. The NOx SIP Call went into effect in 2003 and this may have contributed to the observed decrease in the number of ozone exceedances.

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Trajectory Analysis

A trajectory is a three dimensional representation of the path an air parcel followed based on forecast or archived meteorological data. A backward trajectory is the path the parcel took to reach a specific point in time and space, while a forward trajectory is the path the parcel followed upon leaving a specific time and place.

MEDEP-BAQ staff meteorologists conducted a trajectory analysis of ozone exceedances from the 2000 through 2005 ozone seasons. When an 8-hour ozone exceedance was recorded in the Midcoast Nonattainment Area, the analysis included every hour ozone levels were equal to or greater than 85 ppb. The time of the ozone value was converted from Eastern Standard Time (EST) to Universal Time Code (UTC) by adding 5 hours.

The National Oceanic and Atmospheric Administration (NOAA)'s Air Resources Laboratory HYSPLIT (HYbrid Single-Particle Lagrangian Integrated Trajectory) is a computer model used to create and map trajectories. The model uses gridded meteorological data. For more information about HYSPLIT please refer to the following document: "Description of the HYSPLIT 4 Modeling System by Draxler and Hess."

MEDEP-BAQ staff meteorologists used HYSPLIT to create the trajectories included in this analysis. The model was set to create 24-hour back trajectories from 10 meters (m) above ground level at each site and to include vertical velocity. The archived ETA Data Assimilation System (EDAS) meteorological (MET) data set was used for most trajectories because this was the most consistently available MET data set. EDAS data at 80km spacing was available prior to 2004. The trajectories created for 2004 and 2005 events utilized the EDAS 40km MET files. There were several days when the EDAS MET file was missing data. When this occurred, the Global Final Analysis (FNL) MET data set was used.

For each run, the HYSPLIT model generates both a graphical presentation of the trajectories and a text file. The text file contains information about the hourly endpoints along each trajectory path including the location in time and space. Hundreds of endpoint text files were subsequently loaded into an Access database, which was then mapped in ARCMAP, a geographical mapping tool used within the MEDEP.

The maps visually display thousands of endpoints allowing the viewer to readily identify the transport patterns which result in high levels of ozone in Maine. Two maps have been created for the Midcoast Nonattainment Area. Figure C-2 displays the endpoints based on time of day: red depicts the solar peak, green depicts night-time hours and orange and yellow are the transitions between the two. Figure C-3 displays the endpoints based on vertical height using both color and size to differentiate between the various heights.

Utilizing both means of displaying the endpoints resulted in a greater understanding of the transport patterns during high ozone events than would have been gained by either alone. Figure C-3 shows that southwest transport at the surface is the largest contributor to high concentrations of ozone. Transport from a more westerly direction is that of sinking air which is then caught in surface flow and transported to the monitors. Both figures illustrate that high concentrations of ozone are not caused by sources within the state of Maine. Thus, high ozone events are predominantly due to southwest surface winds bringing ozone and its precursors into Maine.

Figure C-2 Trajectory by hour

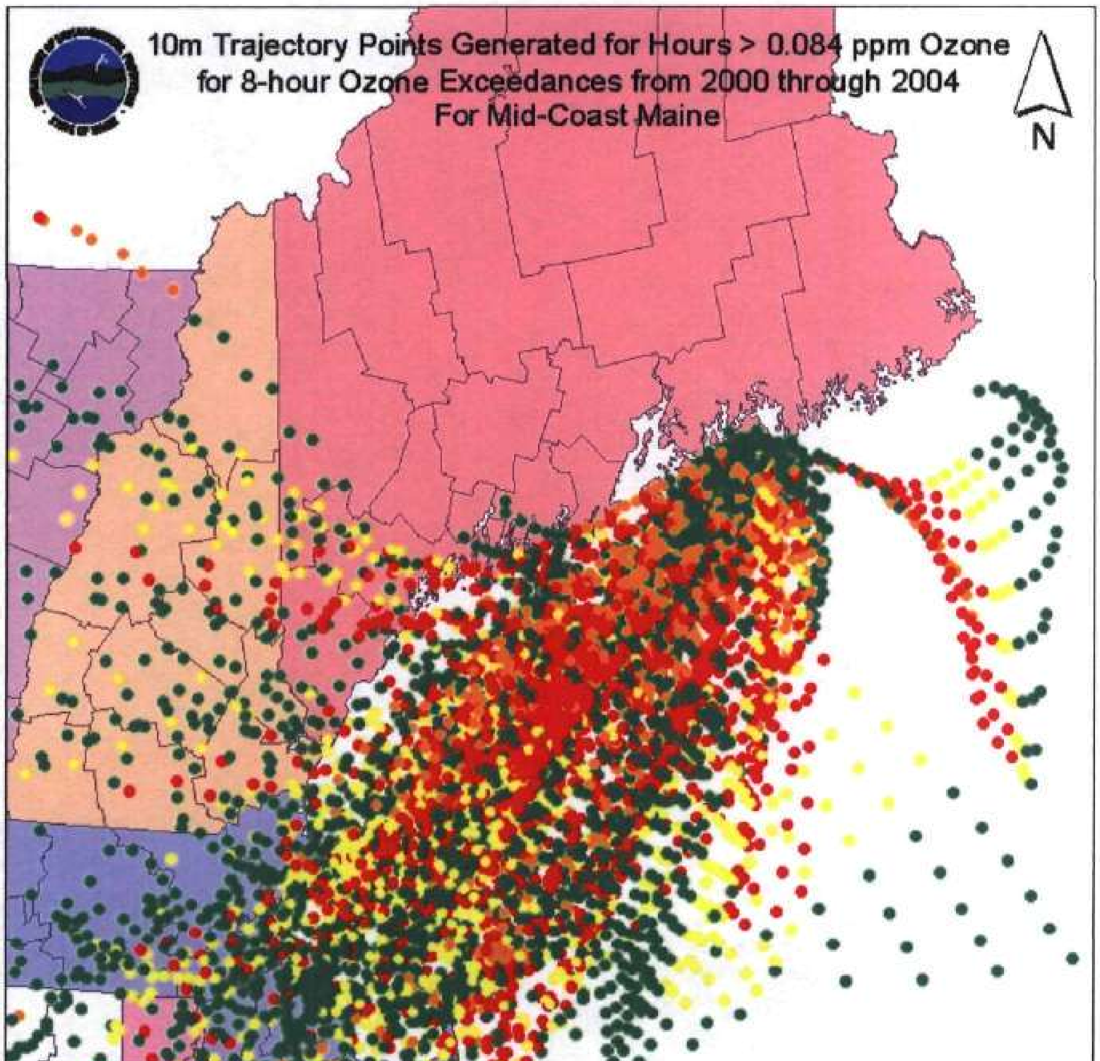

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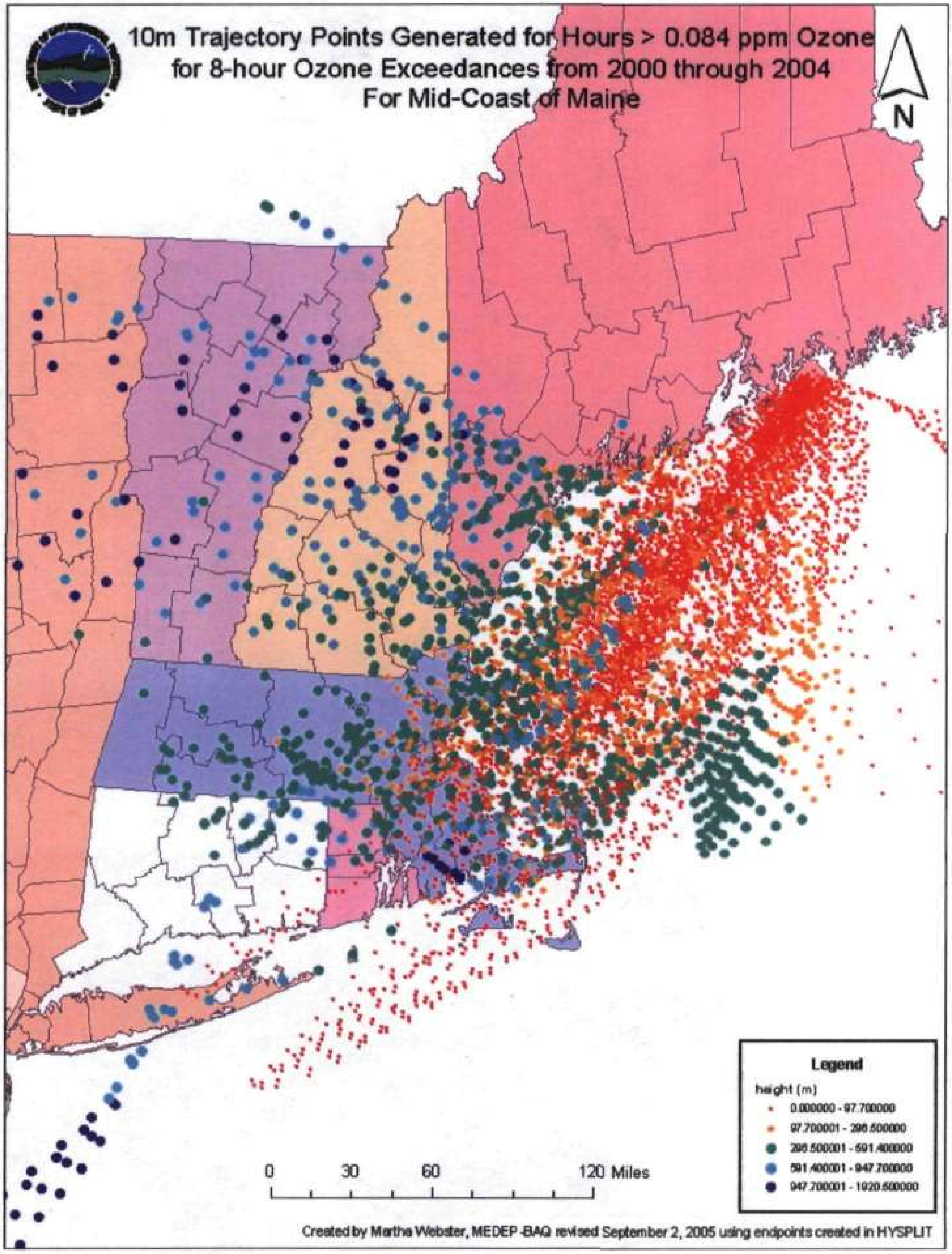
Figure C-3 Trajectory by height



Streamline Analysis

MEDEP-BAQ staff meteorologists utilize many different tools to analyze ozone behavior in Maine.. Streamlines are one of these important tools. Streamline graphics depict the wind field at a given time and place.

Most ozone analyses focus on ozone exceedances in Maine, however, it is equally important to study occasions when conditions were favorable for ozone production in New England, yet Maine did not record exceedances.

A streamline analysis was performed for the 2000 through 2005 ozone seasons, when conditions that favor ozone production were present (high temperatures with bright sunshine). Therefore, the criteria for choosing which dates to analyze when Maine **DID NOT** record ozone exceedances were as follows:

- Days when either Augusta or Bangor, Maine recorded temperatures 85EF or higher, and/or
- Days when major cities in New England recorded temperatures of 90EF or higher, and/or
- Days when ozone exceedances occurred elsewhere in New England.

Using these criteria, 135 days were identified for the streamline analysis.

The streamline graphics for New England were generated and downloaded from the National Oceanic and Atmospheric Administration's (NOAA) Real-time Environmental Applications and Display sYstem (READY) web site (http://www.arl.noaa.gov/ready/ametus.html) using archived meteorological files. The most detailed meteorological data available for each date was used to generate the streamline graphics at 18z (2 PM EDT) for each day and both temperature and streamlines were displayed. EDAS meteorological data was used for all but one date due to lack of data., [EDAS data was available at 80km spacing through 2003. Beginning with the 2004 season, EDAS data at 40km spacing became available.]

Approximately 73% of the streamline graphics clearly demonstrated that, while temperatures were high (as defined above) in the region and/or ozone exceedances occurred in Southern New England, the winds were not conducive to transport ozone and/or its precursors to Maine. On 37 days (the remaining 27%), the graphics displayed southwest winds over at least some part of Maine as well as meeting at least one of the criteria above. These days warranted further analysis and are referred to as 'ozone potential days'. Of these ozone potential days, there were few or no ozone exceedances recorded in the region approximately 60% of the time, so there was less ozone and its precursors available to be transported to Maine. Another 13% of the time, either clouds or wind shifts prevented ozone exceedances in Maine. Conditions may have contributed to ozone exceedances in Maine the next day 19% of the time. Ozone potential days were categorized in the following manner:

- No exceedances in the region,
- Little ozone in the region – only a few sites recorded exceedances (often in Connecticut),
- Transport shutdown – incoming front shifted winds before transport could cause exceedances in Maine,

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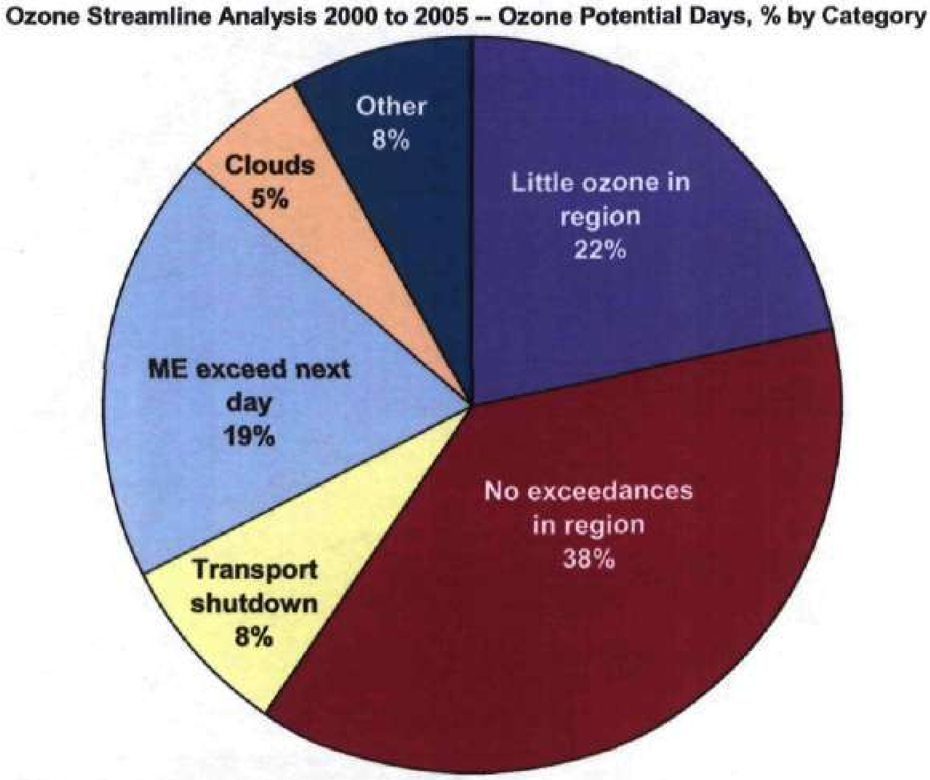
- Clouds – clouds moved into Maine during the afternoon effectively reducing ozone concentrations,
- ME exceed next day – conditions on these days were not conducive to same day ozone exceedances in Maine, however likely contributed to exceedances which occurred the following day, and
- Other – three days defied categorization, each was a special case in and of itself.

Ozone potential days' percentages are displayed by category in Figure C-4.

Figure C-4 Ozone Potential



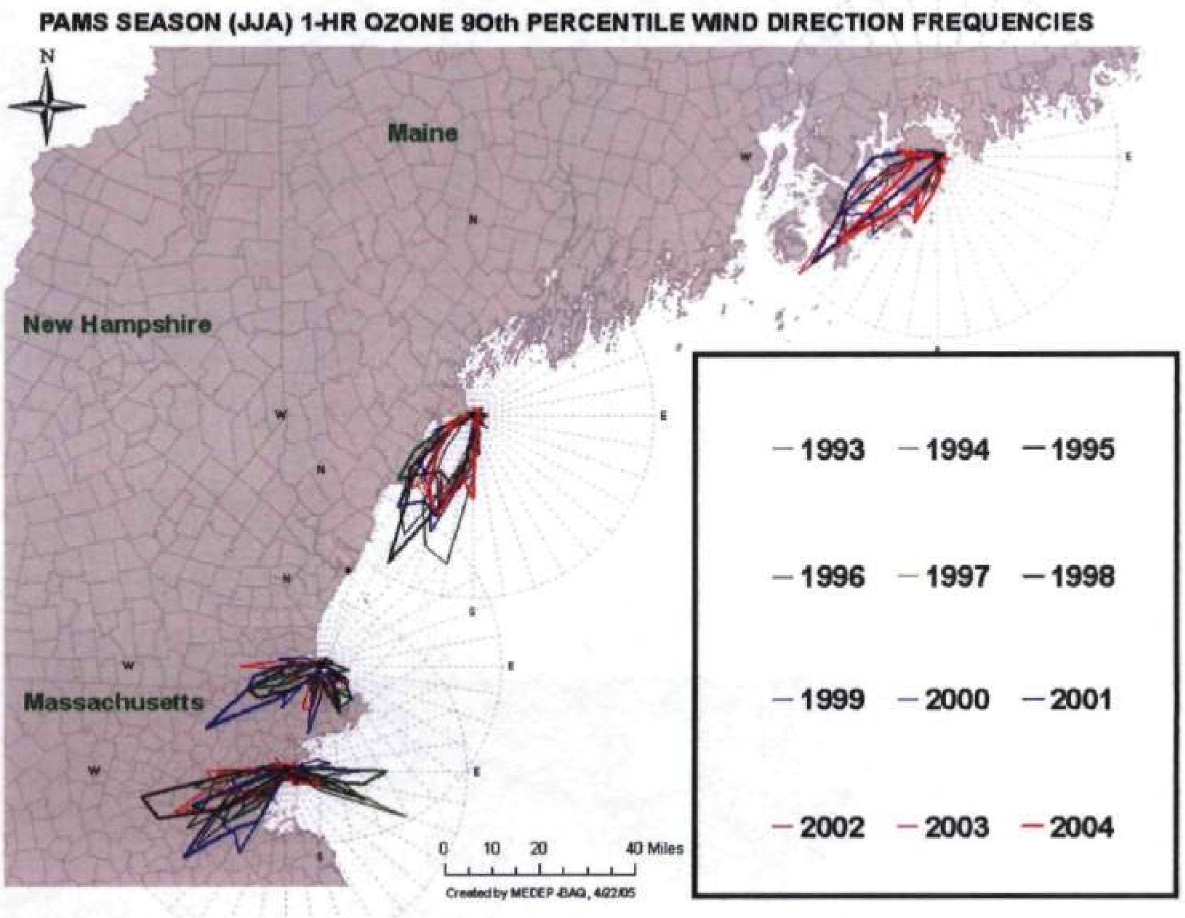
In summary, the streamline analysis further demonstrates that high temperatures and bright sunshine are not the sole cause of ozone exceedances in Maine. Ozone and its precursors must be brought into the state, namely from the highly populated areas to the southwest of Maine.

PAMS – Meteorological Data

Photochemical assessment monitoring sites (PAMS) monitor chemicals associated with ozone formation, ozone and meteorological data.

Wind frequency plots using the PAMS data build upon the trajectory and streamline analyses presented previously. In Figure C-5, the wind direction frequency at various ozone levels is plotted using Excel then superimposed over the site on a map for easy visual reference. Wind direction during high ozone events clearly demonstrates that it is southwest winds from urban areas outside of Maine that contribute to the exceedances.

Figure C-5 Wind Frequency



In Figure C-6, the wind speed during ozone event days is compared with the seasonal average wind speed. Both are graphed by hour of day. There is one site (Cadillac Mountain) in the graph from the Midcoast Nonattainment Area. While all sites show an increase in wind speed during the afternoon for all days, there is little difference between ozone events and the seasonal average for most sites. Cadillac Mountain is the exception with wind speeds during the afternoon of event days is significantly faster than the average daily winds. As with the previously presented analyses this graph clearly demonstrates that it is not stagnant conditions

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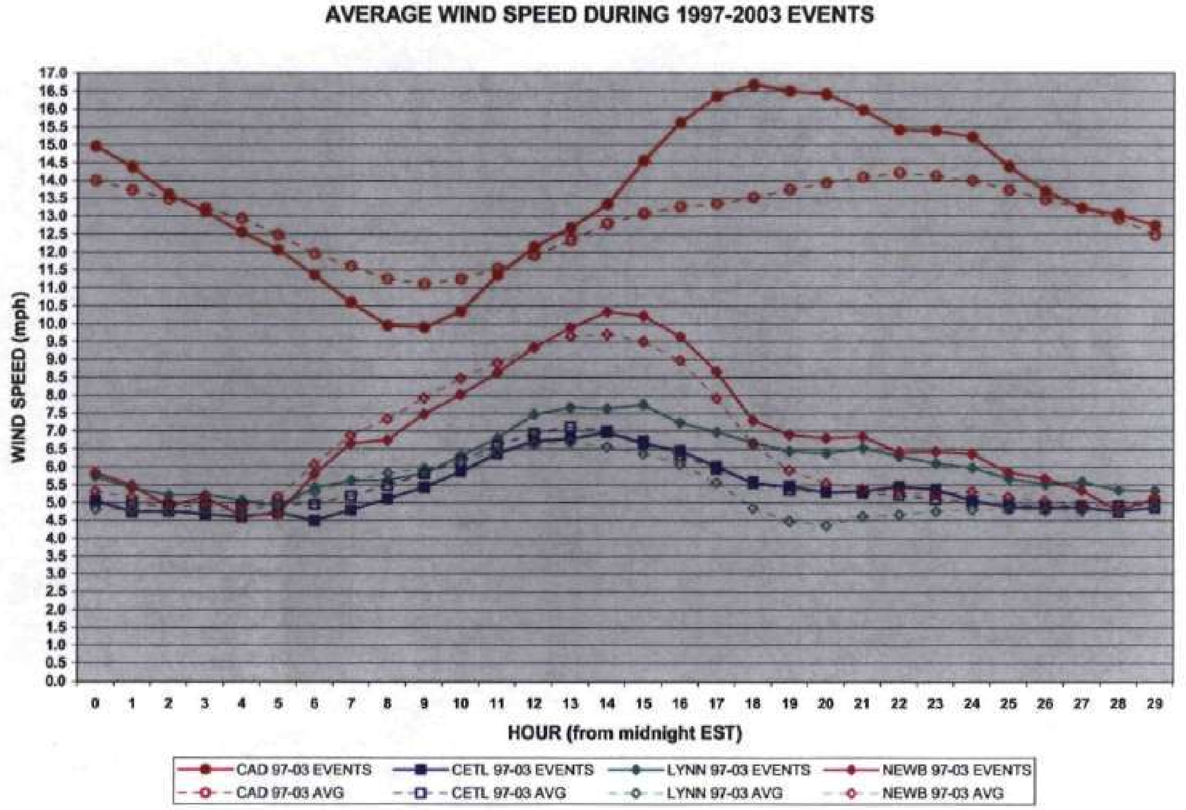
which cause ozone buildup in Maine, but rather wind is required to bring ozone and its precursors into the state.

Figure C-6 Wind Speed



Anomaly Plots

Annual anomaly plots were created for June, July and August of 1988 through 2005 online at http://www.cdc.noaa.gov/cgi-bin/Composites/ . (NOAA CIRES Climate Diagnostics Center in Boulder Colorado). These anomaly plots are presented following the discussion. Meteorological parameters affecting ozone concentrations were chosen for review as outlined below.

Surface variables affecting ozone concentrations

- Wind Speed and Pressure – surface transport indicator
- Temperature - More ozone production with higher temperatures
- Precipitation– lower levels allow more ozone production

Upper air variables affecting ozone concentrations

- 850mb (just above the surface layer) heights and Wind Speed and 250mb (jet stream height) Wind Speed – long range transport aloft and air mass movement indicators
- 850mb Temperature– Fewer clouds and more ozone production with higher temperatures

The 2005 Ozone Season was characterized by some parameters favoring ozone production and transport and some which did not, as listed below:

Conducive to ozone in Maine
- Surface and 850mb Temperatures – Above normal temperatures similar to Ozone Seasons with many exceedances
- 850mb heights, jet stream location– more sunshine, fewer showers and thunderstorms and slow moving air masses

Not conducive to ozone in Maine
- Surface Pressure and winds – Higher pressures over Maine and especially east and northeast of Maine resulting in more southerly component of the surface wind (tropical "clean" air mass)
- Transport aloft (850mb winds) – lighter than normal resulting in less ozone and ozone precursors being transported to Maine

Table C-1 compares the various meteorological parameters with ozone exceedance days for each year for the months of June, July and August. The A's in the table identify those parameters which favored ozone for that year. Red indicates strongly favorable. The B's in the table identify those parameters which did NOT favor ozone for that year. Blue indicates strongly unfavorable.

Each year some parameters will favor ozone build up in Maine while others will not. The sole exception to that statement is 2004 which ranged from slightly unfavorable to strongly unfavorable and resulted in the fewest ozone exceedances on record for Maine.

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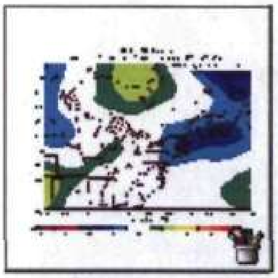
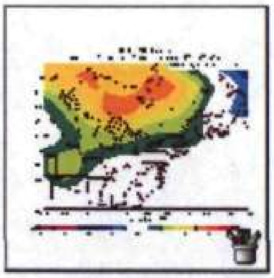
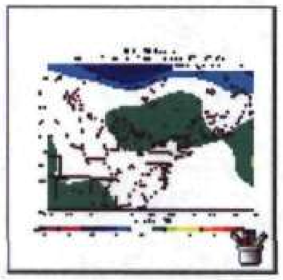
When comparing 2002 (14 exceedances) and 2005 (3 exceedances) the greatest differences between the two years relate to wind direction at the surface. It is important to note that in 1988, the year with the greatest number of exceedances, the wind direction was not as conducive to ozone transport as other high-years (1991, 1993, 1995 and 2002). When ozone precursors are reduced, as mandated by emissions control programs at the state and federal levels, wind direction becomes a more critical factor for ozone buildup in Maine.

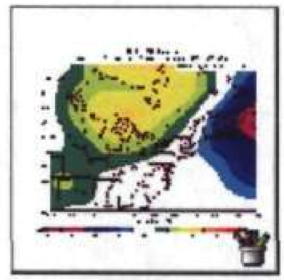
As demonstrated in table C-1, many meteorological conditions favored ozone buildup in 2005. Thus, it was not unusual meteorological conditions that allowed the Midcoast Nonattainment Area to monitor attainment.

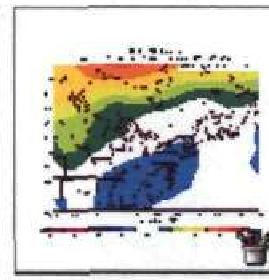
Figure C-7 SURFACE PRESSURE ANOMALIES


Surface Pressure anomalies JJA 1988

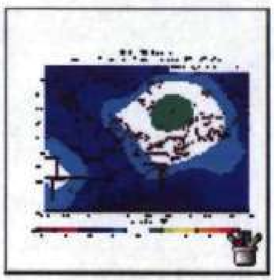

Surface Pressure anomalies JJA 1989

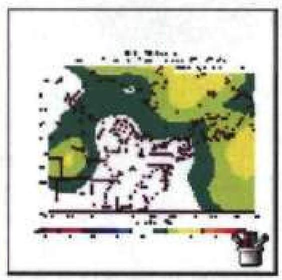

Surface Pressure anomalies JJA 1990

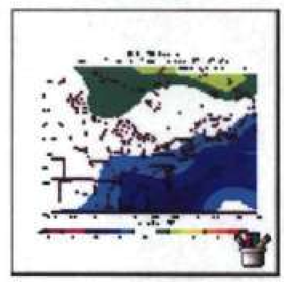

Surface Pressure anomalies JJA 1991

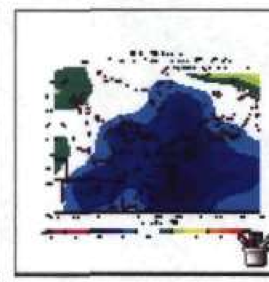

Surface Pressure anomalies JJA 1992

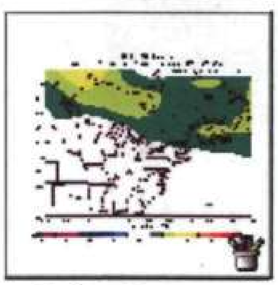

Surface Pressure anomalies JJA 1994

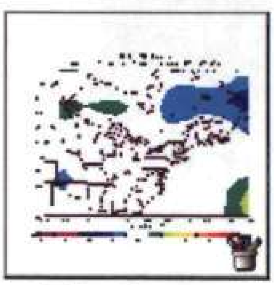

Surface Pressure anomalies JJA 1995

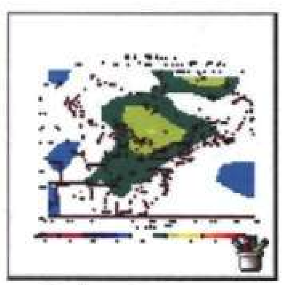

Surface Pressure anomalies JJA 1996

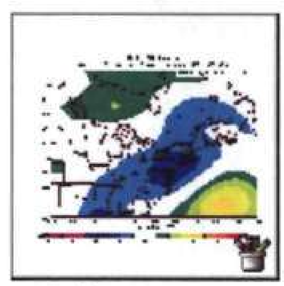

Surface Pressure anomalies JJA 1997


Surface Pressure anomalies JJA 1998


Surface Pressure anomalies JJA 2000


Surface Pressure anomalies JJA 2001


Surface Pressure anomalies JJA 2002


Surface Pressure anomalies JJA 2003

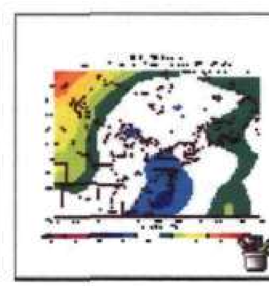
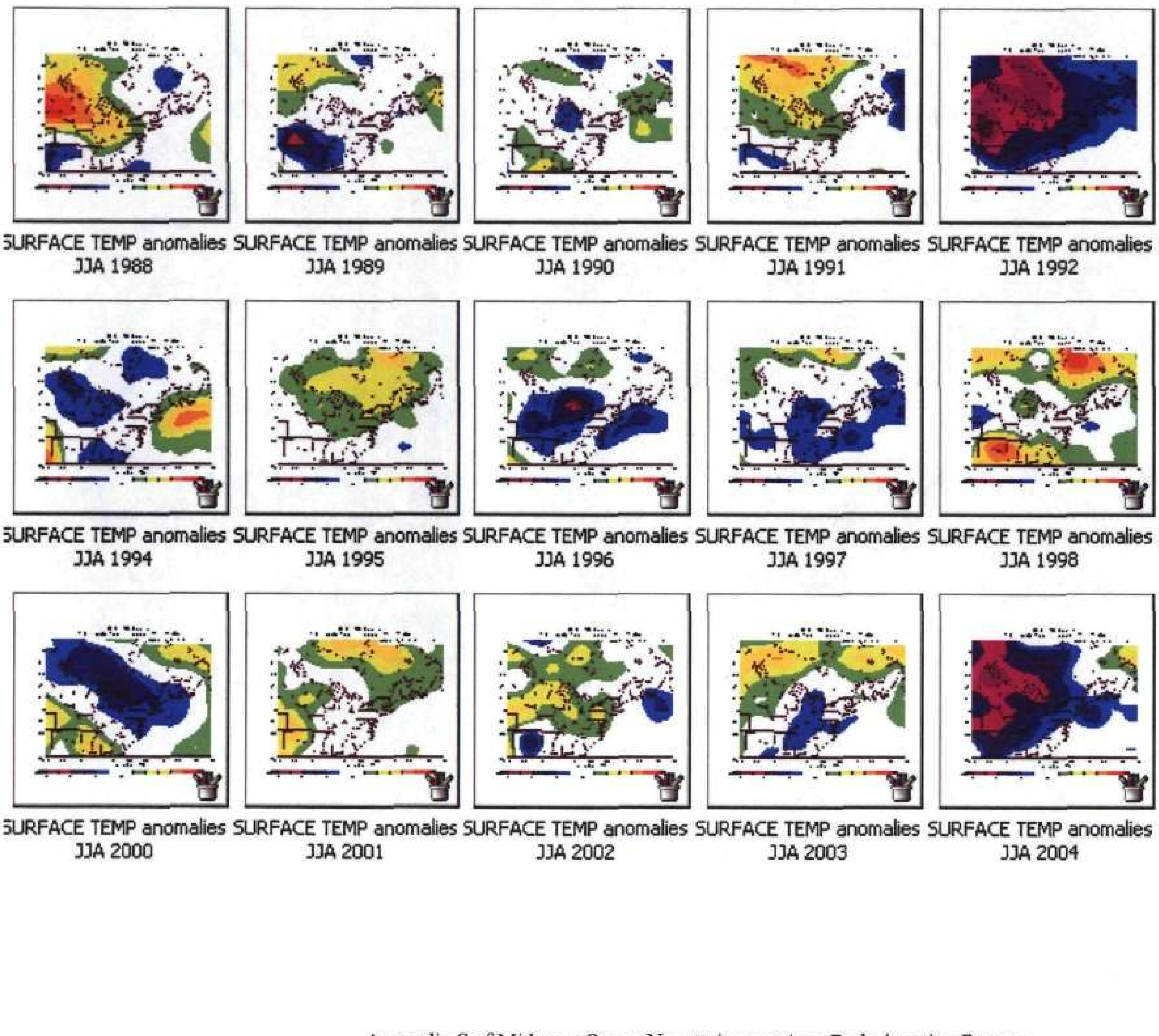

Surface Pressure anomalies JJA 2004

Figure C-8 SURFACE TEMPERATURE ANOMALIES



SURFACE TEMP anomalies JJA 1988

SURFACE TEMP anomalies JJA 1989

SURFACE TEMP anomalies JJA 1990

SURFACE TEMP anomalies JJA 1991

SURFACE TEMP anomalies JJA 1992

SURFACE TEMP anomalies JJA 1994

SURFACE TEMP anomalies JJA 1995

SURFACE TEMP anomalies JJA 1996

SURFACE TEMP anomalies JJA 1997

SURFACE TEMP anomalies JJA 1998

SURFACE TEMP anomalies JJA 2000

SURFACE TEMP anomalies JJA 2001

SURFACE TEMP anomalies JJA 2002

SURFACE TEMP anomalies JJA 2003

SURFACE TEMP anomalies JJA 2004

Figure C-9 SURFACE WIND SPEED ANOMALIES

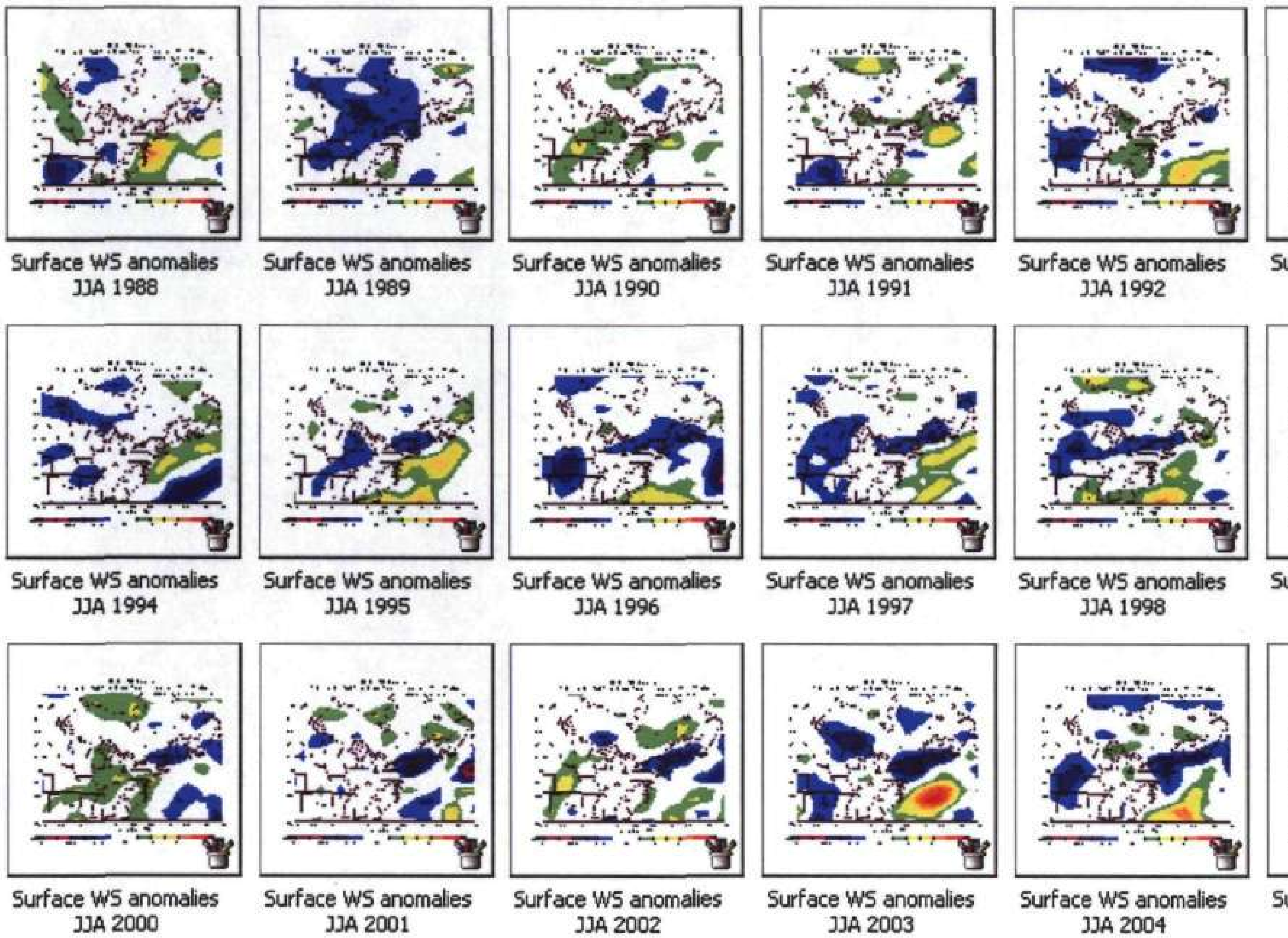
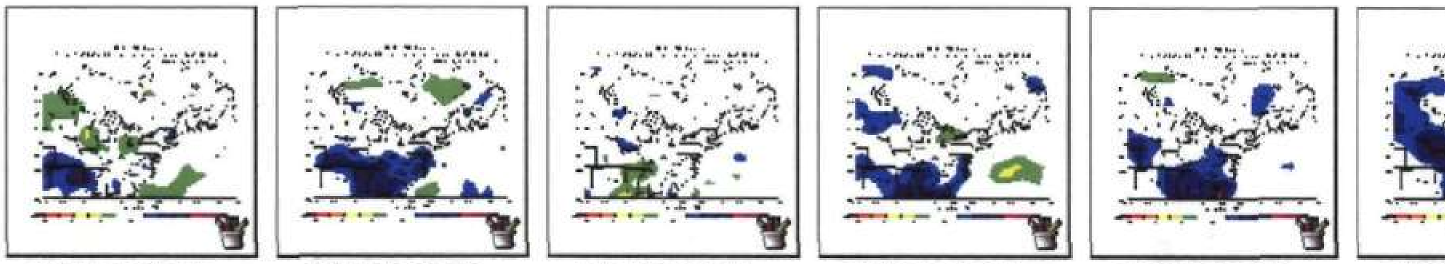
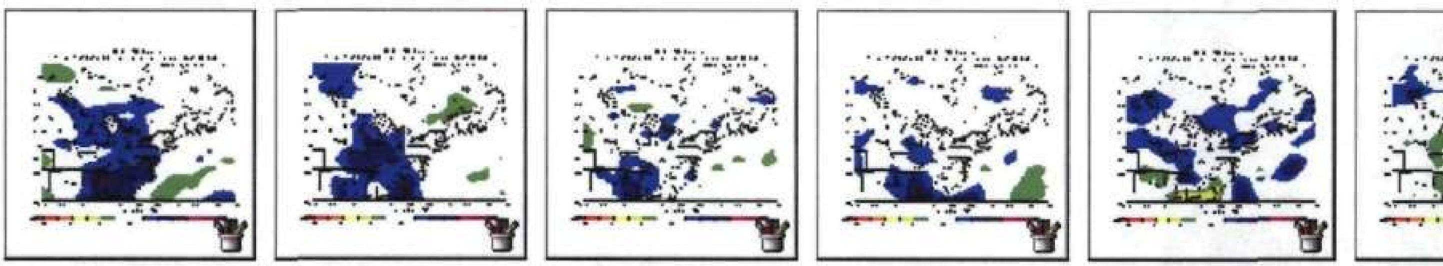


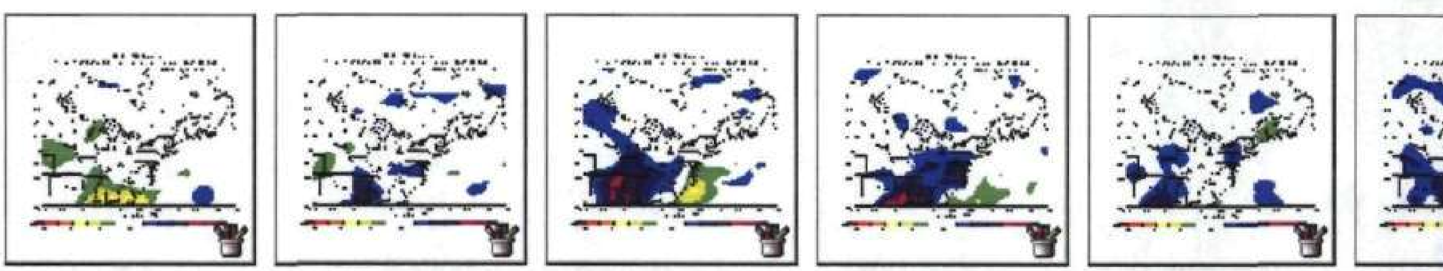
Figure C-10 SURFACE PRECIPITATION ANOMALIES



SURFACE PRECIP anomalies JJA 1988 | SURFACE PRECIP anomalies JJA 1989 | SURFACE PRECIP anomalies JJA 1990 | SURFACE PRECIP anomalies JJA 1991 | SURFACE PRECIP anomalies JJA 1992 | SURF anomal



SURFACE PRECIP anomalies JJA 1994 | SURFACE PRECIP anomalies JJA 1995 | SURFACE PRECIP anomalies JJA 1996 | SURFACE PRECIP anomalies JJA 1997 | SURFACE PRECIP anomalies JJA 1998 | SURF anomal



SURFACE PRECIP anomalies JJA 2000 | SURFACE PRECIP anomalies JJA 2001 | SURFACE PRECIP anomalies JJA 2002 | SURFACE PRECIP anomalies JJA 2003 | SURFACE PRECIP anomalies JJA 2004 | SURF anomal

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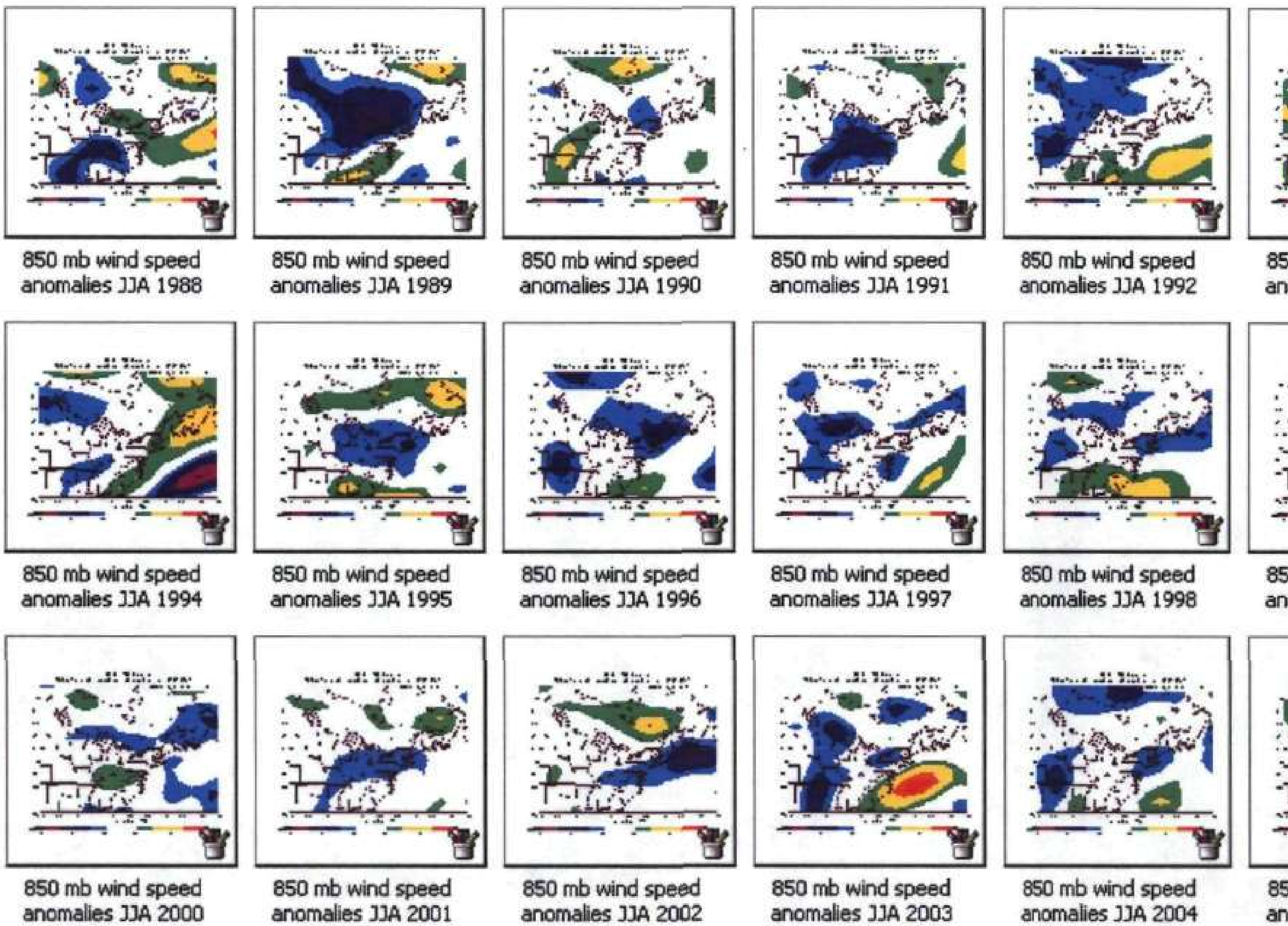
Figure C-11 850mb WIND SPEED ANOMALIES



850 mb wind speed anomalies JJA 1988

850 mb wind speed anomalies JJA 1989

850 mb wind speed anomalies JJA 1990

850 mb wind speed anomalies JJA 1991

850 mb wind speed anomalies JJA 1992

850 mb wind speed anomalies JJA 1994

850 mb wind speed anomalies JJA 1995

850 mb wind speed anomalies JJA 1996

850 mb wind speed anomalies JJA 1997

850 mb wind speed anomalies JJA 1998

850 mb wind speed anomalies JJA 2000

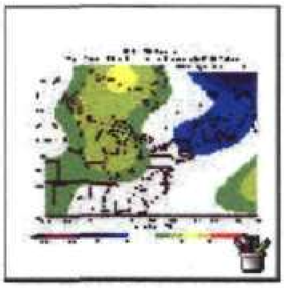
850 mb wind speed anomalies JJA 2001

850 mb wind speed anomalies JJA 2002

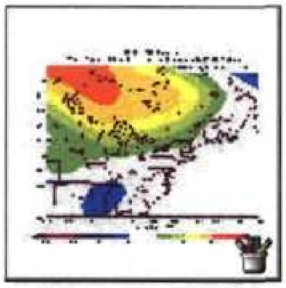
850 mb wind speed anomalies JJA 2003

850 mb wind speed anomalies JJA 2004

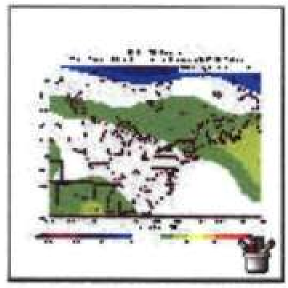
Figure C-12 850mb HEIGHT ANOMALIES



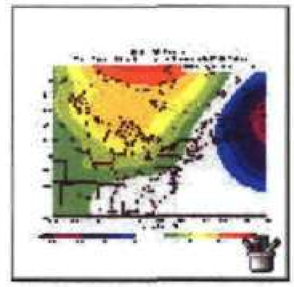
850 mb height anomalies JJA 1988



850 mb height anomalies JJA 1989

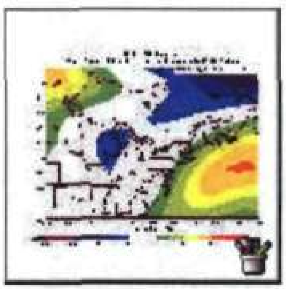


850 mb height anomalies JJA 1990

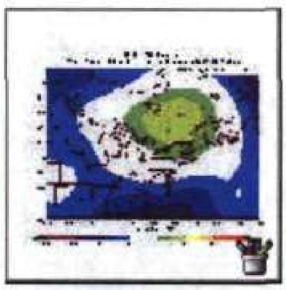


850 mb height anomalies JJA 1991

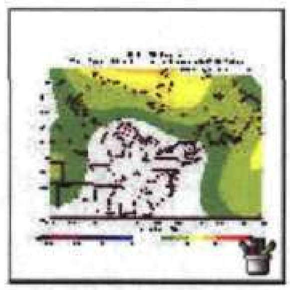
850 mb height anomalies JJA 1992



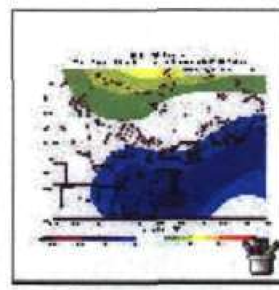
850 mb height anomalies JJA 1994



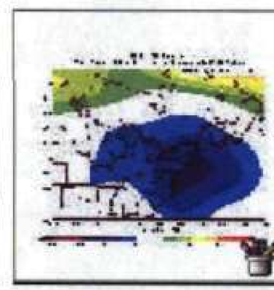
850 mb height anomalies JJA 1995



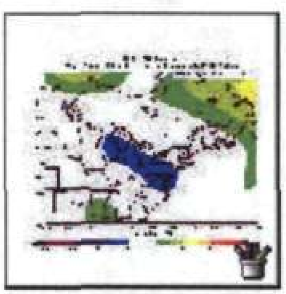
850 mb height anomalies JJA 1996



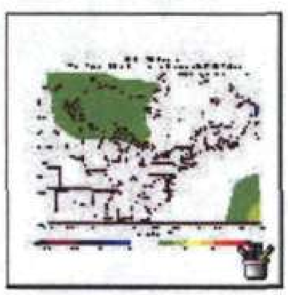
850 mb height anomalies JJA 1997



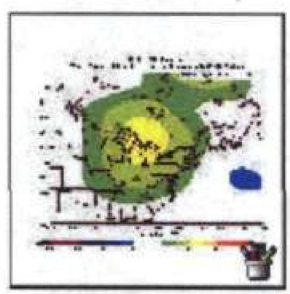
850 mb height anomalies JJA 1998



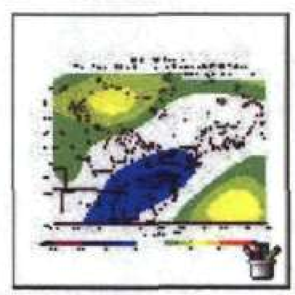
850 mb height anomalies JJA 2000



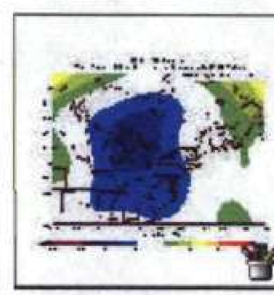
850 mb height anomalies JJA 2001



850 mb height anomalies JJA 2002



850 mb height anomalies JJA 2003



850 mb height anomalies JJA 2004

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Figure C-13 850mb TEMPERATURE ANOMALIES

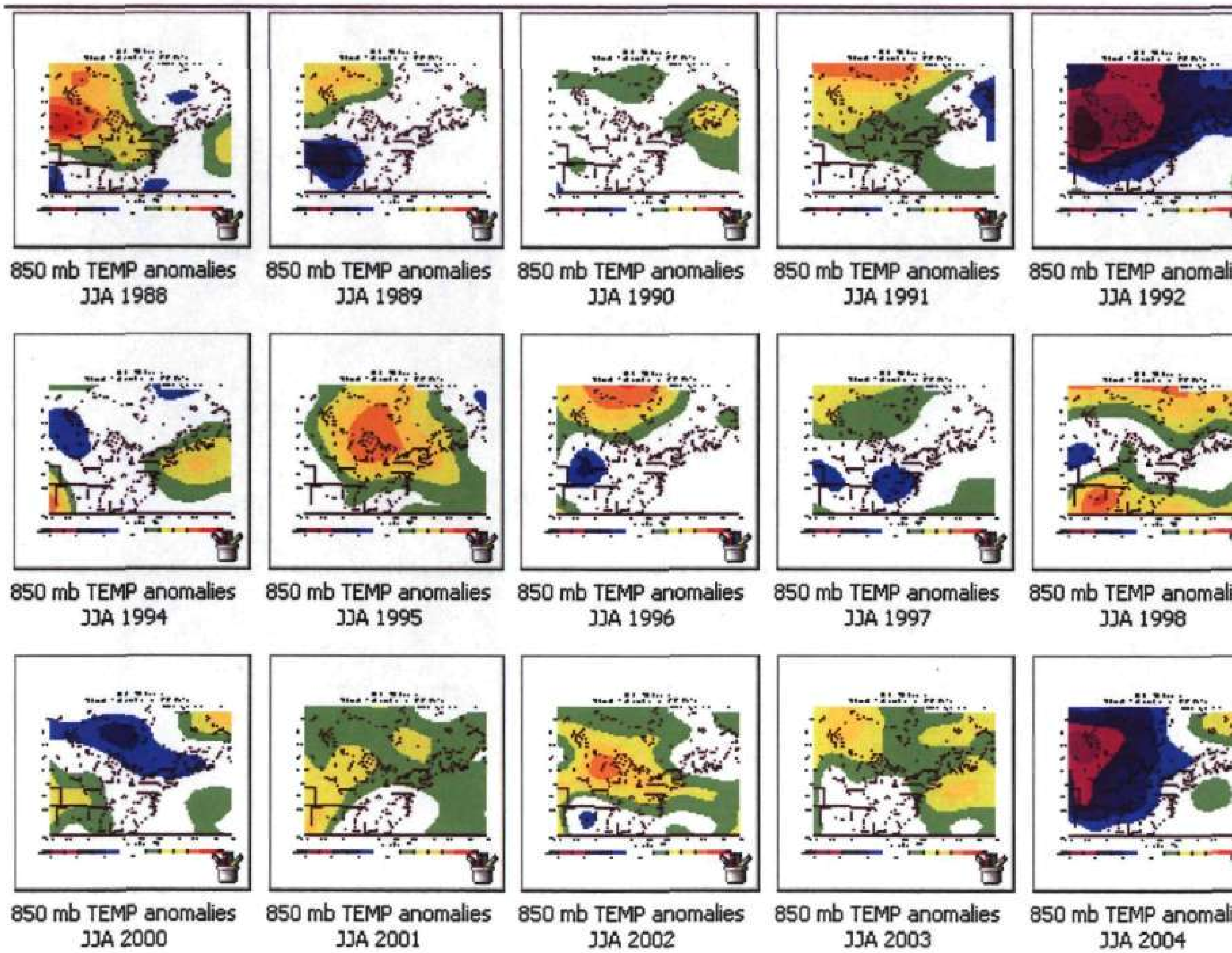
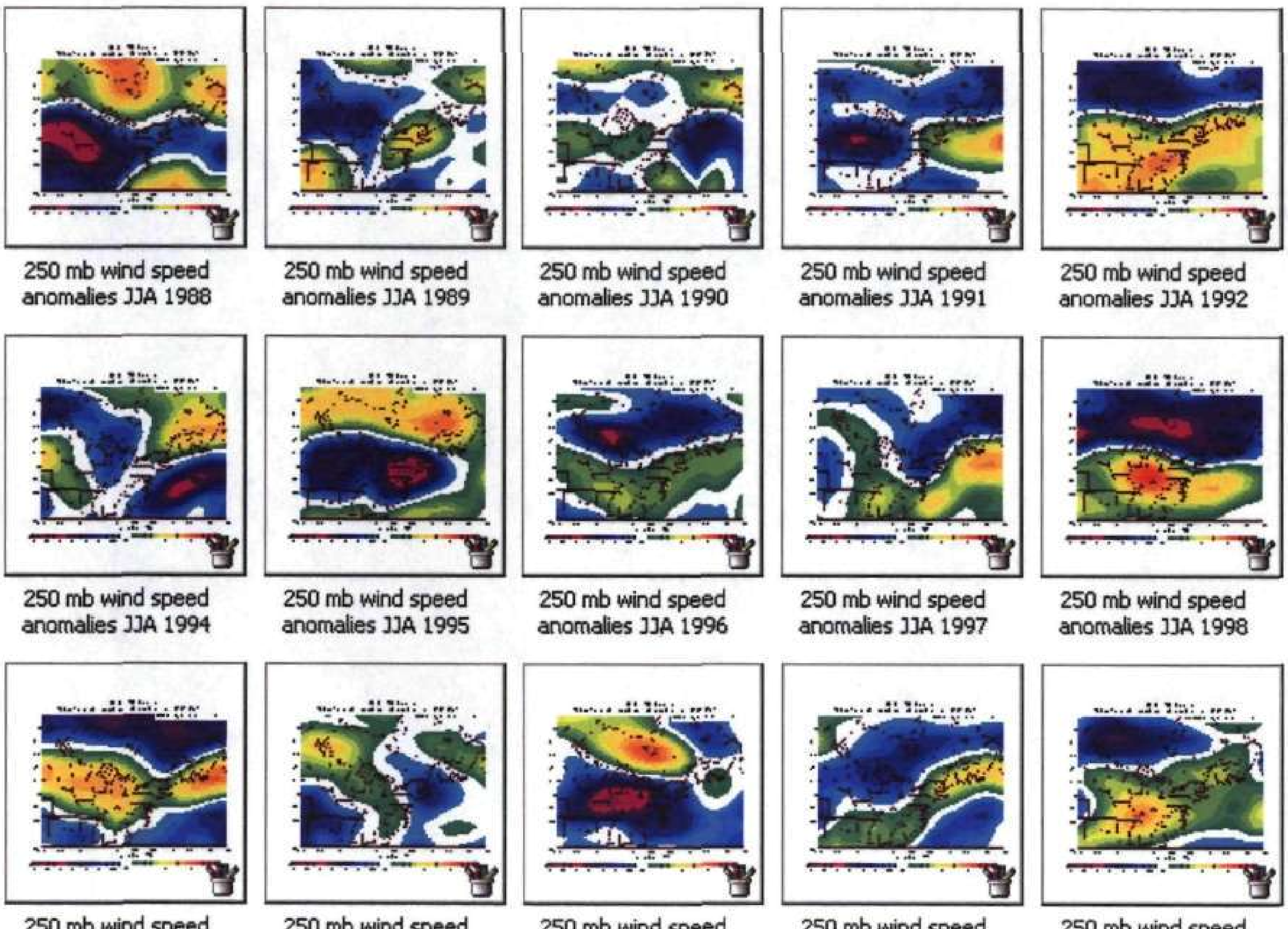


Figure C-14 JET STREAM WIND SPEED ANOMALIES



250 mb wind speed anomalies JJA 1988

250 mb wind speed anomalies JJA 1989

250 mb wind speed anomalies JJA 1990

250 mb wind speed anomalies JJA 1991

250 mb wind speed anomalies JJA 1992

250 mb wind speed anomalies JJA 1994

250 mb wind speed anomalies JJA 1995

250 mb wind speed anomalies JJA 1996

250 mb wind speed anomalies JJA 1997

250 mb wind speed anomalies JJA 1998

250 mb wind speed anomalies JJA 2000

250 mb wind speed anomalies JJA 2001

250 mb wind speed anomalies JJA 2002

250 mb wind speed anomalies JJA 2003

250 mb wind speed anomalies JJA 2004

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Table C-1 Summary of Anómaly Plot Data with Ozone exceedance data

number of monitors	6	6	10	10	10	11	14	14	13	15	16	16	16	15
EXCEEDANCE DAYS	29	6	12	15	9	13	9	13		11	7	8		10
EXCEEDANCE MONITORS	131	30	39	70	35	41	30	48	15	41	26	22	4	43
EXCEEDANCES PER MONITOR	21.8	5.0	3.9	7.0	3.5	3.7	2.1	3.4		2.7	1.6	1.4		2.9
EXCEEDANCE HOURS	1092	227	272	508	217	189	143	281	98	259	208	148	18	297
EXCEEDANCE HOURS PER MONITOR	182.0	37.8	27.2	50.8	21.7	17.2	10.2	20.1		17.3	13.0	9.3		19.
MODERATE AQI DAYS	44	27	26	32	29	26	35	31	39		36	32		26
MODERATE MONITORS	261	90	120	184	143	134	159	193	140	151	149	158	76	15
MODERATES PER MONITOR	43.5	15.0	12.0	18.4	14.3	12.2	11.4	13.8	10.8	10.1		9.9		10.
MET (UNADJUSTED)	6		2	6	-4	2	6	4				8	-4	6
MET (ADJUSTED)	14	-6	2	16		2	14	12				14		4
SURFACE PARAMETERS:	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	200
PRESSURE (ANOMOLY)		A	A	A	B	A	A	A	A	B		A	A	A
PRESSURE (ORIENTATION)	A	B	B	A	A	B	A	B	B	A	B	A		A
TEMPERATURE	A	B	B	A		A	A	A			A	A		A
WIND SPEED	A		A	A	A	B	A	A	B	B	B	A	A	
SOIL MOISTURE	A		A	A		A		B	B	A	B	A	A	A
850mb HEIGHT	B	A	B	A		A	A	A	A			A	B	A
850mb TEMPERATURE	A	B	A	A		A	A	A	B	B	A	A	B	A
850mb WIND SPEED	A	B	B	B	A	B	A	B		B	B	B	B	B
250mb WIND SPEED	A	B	A	B		B	B	A	B	B		A		A
1000-500mb THICKNESS	A	B	A	A		A	A	A	B	B	B	A	B	A

AREA TO LOOK: Midwest and major cities in the east	A	B
PRESSURE (ANOMOLY)	above normal	below n
PRESSURE (ORIENTATION)	SW-NE orientation	NW-SE or
TEMPERATURE	above normal	below n
WIND SPEED	average or slightly above normal	below n
SOIL MOISTURE	average or below normal	above n
850mb HEIGHT	higher than normal	below n
850mb TEMPERATURE	higher than normal	below n
850mb WIND SPEED	normal or higher than normal	below n
250mb WIND SPEED	higher than normal north of USA	higher than normal over
1000-500mb THICKNESS	higher than normal	below n

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Appendix D

Methodology Used to Prepare
State of Maine
2006 Ozone Redesignation Inventories
Revision of April 13, 2006

In the first quarter of 2006, the Air Toxics and Emissions Inventory Program began the development of multi-year, ozone redesignation and maintenance plan inventories for nine Maine counties. The purpose of these inventories was to support the redesignation of two, 8-hour ozone nonattainment areas and four, 1-hour nonattainment areas to attainment status and provide a long-term demonstration that attainment could be maintained.

In its letter to James Brooks on December 6, 2005, EPA outlined the requirements of this inventory:

- 2002 summer, daily emissions inventories for NOx and VOC which would serve as the base year for the four, 1-hour nonattainment area maintenance plans;
- 2005 summer, daily emissions inventories for NOx and VOC which would serve as the base year for the two, 8-hour nonattainment area maintenance plans;
- 2009 summer, daily emissions inventories for NOx and VOC which would serve as an interim year for all six maintenance plans;
- 2016 summer, daily emissions inventories for NOx and VOC which would serve as the end year for all six maintenance plans; and
- On-road mobile source emission projections, by town, for each 8-hour non attainment area. This projection will serve as the NOx and VOC emissions budgets for transportation conformity purposes.

The purpose of this document is to provide a general overview of how each inventory was developed.

Point

Maine once again used the 2002 inventory from the recent SIP amendment, 15% VOC emission reduction plan (approved by EPA, FR14815, March 24, 2006). For later years, the Point Source Inventory data is grown out from 2004, using SIC growth factors from EGAS 5.0 Beta, for developing the 2006 Ozone Redesignation Inventories.

Wyman Station data for 2002 and 2004 is from EPA's Acid Rain Program.

Nonpoint

Maine used its final submission to the 2002 National Emissions Inventory (February 2005, with state edits, May 1, 2005) as the basis for developing the 2006 Ozone Redesignation Inventory. Documentation detailing the development of 2002 NEI emissions estimates can be found in "Methodology Use to Prepare the State of Maine 2002 Emissions Inventory," (September 12, 2005) which is located on Maine DEP's website at http://www.state.me.us/dep/air/emissions/docs/ME_2002_NEI_Narrative_final.pdf.

The following additions and corrections were made to this data set.

- Petroleum and Petroleum Storage: Gasoline Service Stations: Stage 1: Submerged (SCC: 2501060051) and Stage 1: Balanced Submerged (SCC: 2501060053) have been corrected for the ozone summer season. Annual emission estimate use average daily VMT to calculate emissions, however, summer daily VMT must to used to accurately calculate summer ozone season estimates. The ozone season estimates use summer-weighted VMT to allocate fuel distribution. All other parts of the calculation are consistent.

- Petroleum and Petroleum Storage: Gasoline Service Stations: Stage 2: Total (SCC: 2501060100) was deleted from the Nonpoint inventories. These emission estimates are now included with the Onroad sector. It was included in the nonpoint sector with the 2002 NEI because E.H. Pechan, who had developed Maine's Onroad estimates, had specifically excluded Stage 2 emissions from the MOBILE model runs. For these inventories, however, we have left Stage 2 emissions with the Onroad estimates.

- Petroleum and Petroleum Transport: Marine Vessels (SCCs: Crude Oil – 2505020030; Residual Oil – 2505020060; Distillate Oil – 2505020090; and Gasoline – 2505020120) emission estimates were changed after the 2002 NEI submission. In May 2005, Maine learned that all ballast is not segregated and zeroed out emissions from non-segregated ballasts.

- Emission estimates for Commercial Bakeries (SCC: 2302050000) and Breweries (SCC: 2302070001) were added to the ozone redesignation inventories. These categories were include in Maine's recently approved 15% Plan inventory, but were not included in the 2002 NEI. Emissions of wineries and distilleries were once again confirmed to be de *minimus*

- Two Nonroad sources have been grouped with the Nonpoint sector. They include the following categories and SCCs:

Marine Vessels; Port and Underway Emissions	SCCs: 228002100, 2280003100, 2280002200, and 2280003200
Aircraft	SCCs: 2275001000, 2275020000, 2275050000, and 2275060000

- Other Combustion: Prescribed Burning of Rangeland (SCC: 2810020000) was miscoded in Maine's 15% Plan as Other Combustion: Prescribed Burning for Forest Management (SCC: 2810015000). There is no prescribed burning for forest management in Maine's ozone nonattainment areas. Maine DEP then looked at the raw data and realized that the prescribed burning did not occur during the summer season. Therefore, Prescribed Burning of Rangeland was removed from these inventories.

- EPA-generated data for 11 Solvent Categories was added or substituted for Maine data. This data was not available for Maine to use in its 2002 NEI submission. However, with some exceptions, we are using a majority of the data here since it is morecomplete. The 11 Solvent Categories included VOC data for 43 SCCs. Where Maine had submitted state-calculated, VOC emission estimates for SCCs included in the 11 Solvent Categories, we deleted our state-calculated values in favor of the EPA estimates. The following is a list of exceptions to our acceptance of the EPA-generated data for the 11 Solvent Categories:

    1. Emissions estimates for Dry Cleaning – Coin-Operated Cleaners (SCC: 2420020370) were deleted because we have verified, through inspection and survey, that no such facilities exist in Maine.

    2. Emissions estimate for Rubber/Plastics (SCC: 2430000000) was deleted because it was determined during our review of the 2002 Draft NEI that these emissions were included in the Point source inventory.

    3. Emissions from four SCCs in the Miscellaneous Non-Industrial: Consumer and Commercial Products categories (SCCs: 2460100000, 2460200000, 2460400000, and 2460800000) for which Maine has submitted data were reported under different SCCs (SCCs: 2465100000, 2465200000, 2465400000, and 2465800000) by EPA in the 11 Solvent Category data. The State data was deleted from the inventory to prevent double counting.

Growth factors were developed using the EGAS model, version 5.0 beta. Growth factor projections assumed a 2002 base year. New SCCs created for the 11 Solvent Categories were not reflected in the EGAS model. Growth factors, based on similar SCCs, were used where the EGAS model provided none.

Annual emissions were apportioned to tons per summer weekday using EIIP, Volume III, "Introduction to Area Source Emission Inventory Development," Chapter 1, Section 4.2.6, "Seasonal Activity" and Section 4.2.8, "Calculations for Temporal Adjustments" (January 2001). See http://www.epa.gov/ttnchie1/eiip/techreport/volume03/iii01_apr2001.pdf. SCC-specific, apportionment factors can be found in the tblAnnual_to_TPSD table of the 2006RedesignationArea.mdb database.

Maine did take advantage of controls which were currently in effect or would become effective in future years. The following table lists the SCCs and control efficiencies expected in future years.

SCC	Pollutant Code	2002 Control Efficiency	2005 Control Efficiency	2009 Control Efficiency	2018 Control Efficiency	Rule Citation 06-096 CMR
2401001000	VOC	0	0	0.35	0.35	CH 151

SCC	Pollutant Code	2002 Control Efficiency	2005 Control Efficiency	2009 Control Efficiency	2018 Control Efficiency	Rule Citation 06-096 CMR
2401005000	VOC	0	0.38	0.38	0.38	CH 153
2401100000	VOC	0	0	0.35	0.35	CH 151
2415030000	VOC	0	0.66	0.66	0.66	CH 130
2415045000	VOC	0	0.66	0.66	0.66	CH 130
2415065000	VOC	0	0.66	0.66	0.66	CH 130
2415100000	VOC	0	0.66	0.66	0.66	CH 130
2415100385	VOC	0	0.66	0.66	0.66	CH 130
2415300000	VOC	0	0.66	0.66	0.66	CH 130
2415300370	VOC	0	0.66	0.66	0.66	CH 130
2415300385	VOC	0	0.66	0.66	0.66	CH 130
2460100000	VOC	0	0.142	0.142	0.142	CH 152
2460200000	VOC	0	0.142	0.142	0.142	CH 152
2460400000	VOC	0	0.142	0.142	0.142	CH 152
2460600000	VOC	0	0.142	0.142	0.142	CH 152
2460800000	VOC	0	0.142	0.142	0.142	CH 152
2461021000	VOC	0.8	0.8	0.8	0.8	CH 131

Nonroad

Maine used the NONROAD2005 Emission Inventory Model (November 2005) for the nonroad engine emissions modeling. The following table summarizes the inputs.

South	[illegible]	[illegible]
Fuel RVP	*7.8*	*7.8*
Oxygen Weight %	*0.64*	0.5
Gas sulfur %	*0.0197*	0.0339
Diesel Sulfur % (default)	*0.25*	0.2284
CNG/LPG (default)	0.003	0.003
Min Temp	*63*	*63*
Max Temp	*90*	*90*
Avg Temp	75	75
Altitude	LOW	LOW
Stage II Control Factor	0.0	0.0

All redesignation plan counties except Hancock and Waldo

North	[illegible]	[illegible]
Fuel RVP	*9*	*9*
Oxygen Weight %	*0.64*	0.5
Gas sulfur %	*0.0197*	0.0339
Diesel Sulfur % (default)	*0.25*	0.2284
CNG/LPG (default)	0.003	0.003
Min Temp	*63*	*63*
Max Temp	*90*	*90*
Avg Temp	75	75
Altitude	LOW	LOW
Stage II Control Factor	0.0	0.0

Hancock and Waldo Counties only

Notes:
2002 RVP, Oxygen Weight % and Gas sulfur % calculated from 2002 Fuels report.
0.25 Diesel Sulfur % for 2002 supplied by Pechan
NONROAD defaults used for 2005 and later years

Additionally, rail road fuel use data became available after the submission of the 2002 NEI, so the Locomotive emissions were recalculated using the following methodology:

1. Fuel usage totals were obtained from the major rail companies that did business in Maine in 2002, except for the Montreal, Maine & Atlantic Railway company. Montreal did not respond to our repeated requests for fuel use data.

2. To estimate Montreal's fuel consumption, average fuel consumption per track mile value was calculated from the three large railways that had supplied data. One company had supplied both the line fuel usage, and yard engine fuel usage. This percentage (15% in rail yards) was used to estimate the amount of fuel that Montreal burned in its yard engines, which was added to the value estimated for line work.

3. The number of switch yards and track miles per company and county were derived from GIS databases. Railroad tracks leased from the state were apportioned to each company, resulting in a 5% fuel usage increase per company. We assumed that each rail yard had one yard locomotive.

4. To calculate emissions from Yard Locomotives, we multiplied the amount of fuel used in yard engines by the emission factors in Table 7 of the Sierra Document[1]. This was double checked against using the number of switch yards per company, (and the assumption of one yard locomotive per yard) and multiplying this by the emission factor in Table 8 of the Sierra Document. We also made an estimate of fuel use from switch yard engines by using the 226 gallons of fuel per day per engine consumption value in Sierra.

5. The amount of variability in emissions from these three methods, and the lack of cooperation by the rail road companies in volunteering fuel consumption data, points to the need to amend DEP's regulations to compel railroad companies to file emission statements

6. The Sierra Report shows large drop in the sulfur content in locomotive fuel in 2008, and variable emission factors over time. Additionally, we grew out railroad use from 2002 using EGAS growth factors

7. Once the per company emissions had been determined, these emissions were apportioned based on the the amount of track in each county, and the number of switch yards, as determined from the GIS database.

[1] Sierra Research, Inc. "Revised Inventory Guidance for Locomotive Emissions, prepared for the Southeastern States Air Resource Managers, Inc. (Sierra Research, Inc. 1801 J Street, Sacramento, CA 95814), June 2004

Onroad

Maine used MOBILE6.2.03 (September 24,2003) to generate emission factor for the redesignation inventories. The following table summarizes the command inputs used in the input files.

Evaluation Month	7 (July)
Fuel Program	1 (Conventional Gasoline East)
Fuel RVP	7.8 for Kennebec, Androscoggin, Knox, Lincoln, Cumberland, Sagadahoc and York counties 9.0 for Waldo and Hancock counties
Min/Max Temp	63. and 90.

Anti-Tampering Program	For Cumberland County (catalyst removal and gas cap)
	`ANTI-TAMP PROG :`
	`99 83 20 22222 11111111 1 11 096. 12111112`
	
	For all other counties (catalyst removal only)
	`ANTI-TAMP PROG :`
	`99 83 20 22222 11111111 1 11 096. 12111111`

Stage II Refueling	Stage II refueling is only applicable to three counties: Cumberland, Sagadahoc and York counties.
	
	For Cumberland County
	`STAGE II REFUELING :`
	`95 3 45. 4.`
	
	For Sagadahoc County
	`STAGE II REFUELING :`
	`95 3 41. 3.`
	
	For York County
	`STAGE II REFUELING :`
	`95 3 35. 3.`

Inspection/Maintenance Programs	I/M Programs is only applicable to Cumberland County.
	`I/M PROGRAM : 1 1999 2025 1 TRC GC`
	`I/M MODEL YEARS : 1 1974 2025`
	`I/M VEHICLES : 1 22222 11111111 1`
	`I/M COMPLIANCE : 1 96.0`
	`I/M GRACE PERIOD : 1 1`

Maine LEV II Program	Data files specific for Maine's LEV II Program were developed and supplied by EPA.
	`94+ LDG IMP : MELEV2.D`
	`T2 EXH PHASE-IN : LEV2EXH.D`
	`T2 EVAP PHASE-IN : LEV2EVAP.D`
	`T2 CERT : LEV2CERT.D`

Maine created two MOBILE6 input files for each county – one which used the National LEV Program input file and one which used the Maine LEV II Program input files (listed above). Maine is approved to take only 90% of the Maine LEV II credit and both files were needed to calculate those values. 90% of the Maine LEV II credit is taken for all years and all planning areas included in the demonstrations.

Appendix E
Department Rules Incorporated in the State Implementation Plan
As of 6/1/06

State citation	Title/subject	State effective date	EPA approval date	Explanations
Chapter 1	Regulations for the Processing of Applications.	05/20/85	03/23/93, 58 FR 15430.	Portions of Chapter 1
Chapter 100	Definitions.	07/25/95	10/15/96,61 FR 53639.	
Chapter 101	Visible Emissions.	10/10/79	02/17/82, 47 FR 6829.	
Chapter 102	Open Burning.	01/31/72	05/31/72, 37 FR 10842.	
Chapter 103	Fuel Burning Equipment Particular Emission Standard.	01/24/83	02/26/85, 50 FR 7770.	
Chapter 104	Incinerator Particulate Emission Standard.	01/31/72	05/31/72, 37 FR 10842.	
Chapter 105	General Process Source Particulate Emission Standard.	01/31/72	05/31/72, 37 FR 10842.	
Chapter 106	Low Sulfur Fuel Regulations.	02/08/78	01/08/82, 47 FR 947.	
Chapter 107	Sulfur Dioxide Emission Standards for Sulfate Pulp Mills.	01/31/72	05/31/72, 37 FR 10842.	
Chapter 109	Emergency Episode Regulation.	08/14/91	01/12/95, 60 FR 2887.	
Chapter 110	Ambient Air Quality Standards.	07/24/96	03/22/04, 69 FR 13227.	Adopts PSD increments based on PM10, in place of increments based on TSP. [See: Electronic Docket Number EPA-R01-OAR-2004-ME-0001 at www.regulations.gov EXIT disclaimer]
Chapter 111	Petroleum Liquid	09/27/89	02/03/92,	

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	Storage Vapor Control.		57 FR 3948.	
Chapter 112	Gasoline Bulk Terminals.	07/19/95	10/15/96, 31 FR 53639.	
Chapter 113	Growth Offset Regulation.	06/22/94	02/14/96, 61 FR 5694.	Part of New Source Review Program
Chapter 114	Classification of Air Quality Control Regions.	04/27/94	08/30/95, 60 FR 45060.	Revision to Remove Presque Isle as nonattainment for PM_{10}.
Chapter 115	Emission License Regulation.	06/22/94	02/14/96, 61 FR 5694.	Part of New Source Review Program
Chapter 116	Prohibited Dispersion Techniques.	10/25/89	03/23/93, 58 FR 15430.	
Chapter 117	Source Surveillance.	08/09/88	03/21/89, 54 FR 11525.	
Chapter 118	Gasoline Dispensing Facilities.	07/19/95	10/15/96, 61 FR 53639.	Stage II vapor recovery requirements added.
Chapter 119	Motor Vehicle Fuel Volatility Limit.	06/01/00	03/06/02, 67 FR 10100.	Controls fuel volatility in the state. 7.8 psi RVP fuel required in 7 southern counties.
Chapter 120	Gasoline Tank Trucks.	06/22/94	06/29/95, 60 FR 33734.	
Chapter 123	Paper Coater Regulation.	09/27/89	02/03/92, 57 FR 3949.	The operating permits for S.D. Warren of Westbrook, Eastern Fine Paper of Brewer, and Pioneer Plastics of Auburn incorporated by reference at 40 CFR § 52.1020 (c)(11), (c)(11), and (c)(18), respectively, are withdrawn.
Chapter 126 Chapter 126 Appendix A	Capture Efficiency Test Procedures.	05/22/91	03/22/93, 58 FR 15282.	
Chapter 127	New Motor Vehicle Emission Standards.	12/31/00	04/28/05, 70 FR 21959.	Including Basis Statements and Appendix A. Low emission vehicle program, with no ZEV requirements. Program achieves 90% of full LEV benefits. [See: Electronic Docket Number EPA-R01-OAR-2004-ME-0004 at www.regulations.gov EXIT disclaimer]

Chapter 129 Chapter 129 Appendix A	Surface Coating Facilities.	01/06/93	06/17/94, 59 FR 31157.	
Chapter 130	Solvent Cleaners.	06/17/04	05/26/05, 70 FR 30367.	[See: Electronic Docket Number EPA-R01-OAR-2004-ME-0005 at www.regulations.gov EXIT disclaimer]
Chapter 131	Cutback and Emulsified Asphalt.	01/06/93	06/17/94, 59 FR 31157.	
Chapter 132	Graphic Arts: Rotogravure and Flexography.	01/06/93	06/17/94, 59 FR 31157.	
Chapter 133	Gasoline Bulk Plants.	06/22/94	06/29/95, 60 FR 33734.	
Chapter 134	Reasonably Available Control Technology for Facilities that Emit Volatile Organic Compounds.	02/08/95	04/18/00, 65 FR 20753.	Regulations fully approved for the following counties: York, Sagadahoc, Cumberland, Androscoggin, Kennebec, Knox, Lincoln, Hancock, Waldo, Aroostock, Franklin, Oxford, and Piscataquis. Regulation granted a limited approval for Washington, Somerset, and Penobscot Counties.
Chapter 137	Emission Statements.	11/10/93	01/10/95, 60 FR 2526.	
Chapter 138	Reasonably Available Control Technology for Facilities that Emit Nitrogen Oxides.	08/03/94	09/09/02, 67 FR 57154.	Affects sources in York, Cumberland, Sagadahoc, Androscoggin, Kennebec, Lincoln, and Knox counties
Chapter 141 Chapter 141 Supplement - Federal Register 11/30/93 General Conformity Rule	Conformity of General Federal Actions.	09/11/96	09/23/97, 62 FR 49611.	
Chapter 145	NOx Control Program	06/21/01	03/10/05 70 FR 11879	[See: Electronic Docket Number EPA-R01-OAR-2005-ME-0001 at www.regulations.gov EXIT disclaimer]
Chapter 148	Emissions from Smaller-Scale Electric Generating Resources	07/15/04	05/26/05 70 FR 30373	[See: Electronic Docket Number EPA-R01-OAR-2005-ME-0002 at www.regulations.gov EXIT disclaimer]

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Chapter 151	Architectural and Industrial Maintenance (AIM) Coatings	10/06/05	03/17/06 71 FR 13767	[See: Electronic Docket Number EPA-R01-OAR-2005-ME-0003 at www.regulations.gov EXIT disclaimer]
Chapter 152	Control of Emissions of Volatile Organic Compounds from Consumer Products	08/19/04	10/24/05 70 FR 61382	[See: Electronic Docket Number EPA-R01-OAR-2005-ME-0004 at www.regulations.gov EXIT disclaimer]
Chapter 153	Mobile Equipment	02/05/04	05/26/05 70 FR 30367	[See: Electronic Docket Number EPA-R01-OAR-2004-ME-0005 at www.regulations.gov EXIT disclaimer]
Chapter 155	Portable Fuel Container Spillage Control	07/14/04	02/07/05 70 FR 6352	[See: Electronic Docket Number EPA-R01-OAR-2004-ME-0003 at www.regulations.gov EXIT disclaimer]
Vehicle I/M	Vehicle Inspection and Maintenance.	07/09/98	01/10/01, 66 FR 1875.	"Maine Motor Vehicle Inspection Manual," revised in 1998, pages 1-12 through 1-14, and page 2-14, D.1.g. Also, Authorizing legislation effective July 9, 1998 and entitled L.D. 2223, "An Act to Reduce Air Pollution from Motor Vehicles and to Meet Requirements of the Federal Clean Air Act."

Appendix F

Mobile Sources Emissions Budget

Planning Area 2-Midcoast Nonattainment Area							
Hancock	09						
Knox	13						
Lincoln	15						
Waldo	27						
		all emissions expressed in tons per summer week day					
		2005	**2005**	**2009**	**2009**	**2016**	**2016**
Category	**Subcategory**	**VOC**	**NOx**	**VOC**	**NOx**	**VOC**	**NOx**
Point		1.520	4.530	1.640	5.360	1.840	6.080
Nonpoint		14.214	3.659	14.610	3.816	15.989	4.081
Mobile	Onroad	8.664	15.296	6.368	10.731	4.154	5.332
Mobile	Nonroad	13.727	4.713	12.073	4.284	10.217	3.343
Mobile	Locomotives	0.005	0.183	0.005	0.161	0.004	0.135
	Total	38.130	28.381	34.696	24.352	32.204	18.971

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Section 110(a)(1) Maintenance Plans for York, Cumberland, Sagadahoc, Androscoggin, Kennebec, Knox, Lincoln, Waldo and Hancock Counties, Maine

Introduction

On April 30, 2004, the U.S. Environmental Protection Agency (EPA) published the final phase 1 rule for the implementation of the 8-hour ozone national ambient air quality standard (NAAQS).[1] 40 CFR Parts 51.905 (c) and (d) of this rulemaking established maintenance plan requirements for areas designated as attainment for the 8-hour ozone NAAQS that were nonattainment areas, or attainment areas with a maintenance plan under the 1-hour ozone standard. These anti-backsliding provisions require these areas to adopt and submit a plan that will ensure maintenance of the 8-hour ozone standard for at least 10 years from the date of the area's classification as unclassifiable/attainment of the 8-hour ozone NAAQS.

Maintenance Plan Requirements

The 8-hour ozone 110(a)(1) maintenance plan is a SIP revisions providing for continued maintenance of the 8-hour ozone NAAQS in the maintenance area for 10 years from the effective date of the area's designation as unclassifiable/ attainment. The section 110(a)(1) maintenance plan must contain the following elements:

1. An Attainment Inventory;
2. A Maintenance Demonstration;
3. Continued Ambient Air Quality Monitoring;
4. Contingency Plan; and
5. Verification of Continued Attainment.

[1] 69 FR 23951

Description of the 8-Hour Maintenance Areas

Maine has four planning areas that are designated as attainment/unclassifiable for the 8-hour ozone standard that also had a designation of either nonattainment or attainment with an approved maintenance plan for the for the 1-hour ozone standard as of June 15, 2004 (the effective date of the 8-hour ozone standard designation for these areas). These areas are:

Planning Area 1- York, Cumberland and Sagdahoc Counies;
Planning Area 2- Androscoggin and Kennebec Counties;
Planning Area 3- Knox and Lincoln Counties; and
Planning Area 4- Hancock and Waldo Counties

Planning Area 1 was designated as "moderate" nonttainment for the 1-hour ozone NAAQS, and has lapsed in, and out, of attainment with the 1-hour standard since the mid-1990's. This planning area is currently monitoring attainment of the 8-hour ozone standard, but is not *attaining the now-revoked 1-hour ozone standard*. Panning Area 2 was designated as a moderate nonattainment area for the 1-hour ozone standard, and has been monitoring attainment of this standard since the early 1990's. Planning Area 3 was also designated as moderate nonattainment area, and has been monitoring attainment of the 1-hour ozone standard since the early 1990's. Planning Area 4 was designated as a marginal nonattainment area for the 1-hour ozone NAAQS, and was officially redesignated to attainment in 1996. The 8-hour maintenance areas in Maine are illustrated in Figure 1.

Attainment Inventories and Maintenance Demonstration

The Phase I implementation rule provides that the 10-year maintenance period begins on the effective date of the 8-hour ozone NAAQS designation. In order to ensure maintenance of the 8-hour NAAQS, an area must first develop an attainment emissions inventory, which details VOC and NOx emissions for the maintenance area. Although a state may use any of the three years upon which the 8-hour ozone designation was based (i.e., 2001, 2002 and 2003), EPA recommends that areas use 2002 as the attainment inventory base year.[2]

The key element of the maintenance plan is a demonstration that the area will remain in compliance with the 8-hour ozone standard for the 10-year period following the effective date of designation. In order to demonstrate continued maintenance, a state may utilize either an emissions inventory approach, or other methods such as modeling. Maine is utilizing the emissions inventory approach, and has demonstrated that future emissions of ozone precurors will not exceed the attainment inventory levels for each of the Planning Areas.

[2] EPA's Consolidated Emissions Reporting Rule (CERR) already requires the development of a 2002 inventory.

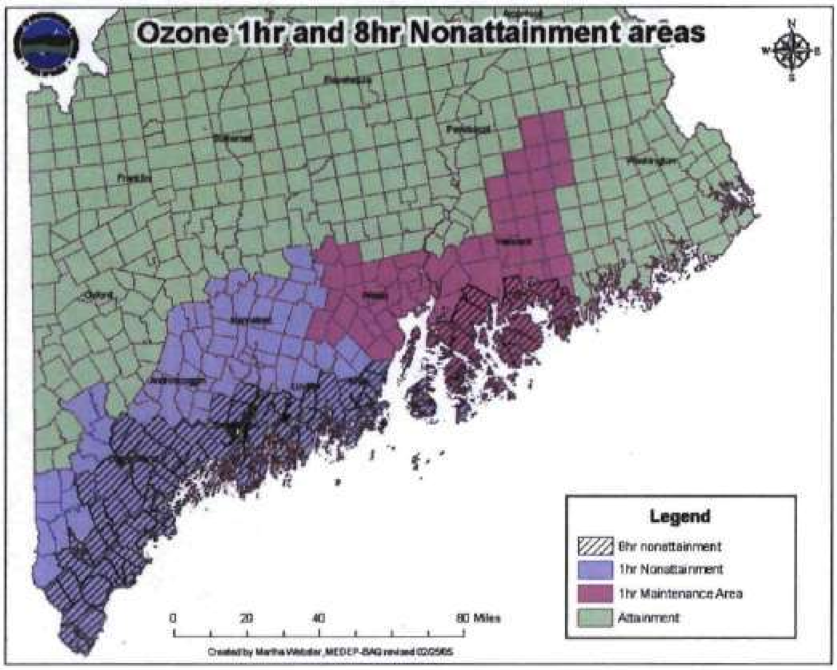

Figure 1

The following tables illustrate both the attainment inventory and maintenance inventories for the Section 110 (a) (1) maintenance areas in Maine[3]:

1 Hour Non-Attainment Area Demonstration							
Planning Area 1							
Cumberland	03						
Sagadahoc	23						
York	31						
		all emissions expressed in tons per summer week day					
		2002	**2002**	**2009**	**2009**	**2016**	**2016**
Category	**Subcategory**	**VOC**	**NOx**	**VOC**	**NOx**	**VOC**	**NOx**
Point		3.290	13.077	3.940	8.780	4.630	10.240
Nonpoint		36.077	5.040	36.356	5.707	40.413	5.937
Mobile	Onroad	30.927	61.225	17.000	33.741	11.261	16.540
Mobile	Nonroad	19.494	10.805	16.161	8.711	14.048	5.911
Mobile	Locomotives	0.018	0.539	0.015	0.408	0.013	0.339
	Total	89.806	90.686	73.472	57.347	70.365	38.967

Planning Area 1- York, Cumberland and Sagadahoc Counties

[3] Full emission inventories for each planning area are contained at ftp://ftp.state.me.us/pub/dep/O3 Redesignation/Draft.

1 Hour Non-Attainment Area Demonstration							
Planning Area 2							
Androscoggin	.01						
Kennebec	.11						
		all emissions expressed in tons per summer week day					
		2002	2002	2009	2009	2016	2016
Category	Subcategory	VOC	NOx	VOC	NOx	VOC	NOx
Point		0.393	2.979	0.620	2.740	0.740	3.180
Nonpoint		12.394	1.433	12.296	1.639	13.471	1.635
Mobile	Onroad	13.188	23.639	7.336	13.291	4.795	6.523
Mobile	Nonroad	5.827	3.782	5.163	3.004	4.386	1.966
Mobile	Locomotives	0.018	0.489	0.015	0.368	0.013	0.304
	Total	31.820	32.322	25.430	21.042	23.405	13.608

Planning Area 2- Androscoggin and Kennebec Counties

1 Hour Non-Attainment Area Demonstration							
Planning Area 3							
Knox	13						
Lincoln	15						
		all emissions expressed in tons per summer week day					
		2002	2002	2009	2009	2016	2016
Category	Subcategory	VOC	NOx	VOC	NOx	VOC	NOx
Point		0.811	6.149	1.140	4.990	1.240	5.650
Nonpoint		6.688	1.985	6.933	2.174	7.641	2.291
Mobile	Onroad	4.316	7.655	2.356	4.173	1.537	2.065
Mobile	Nonroad	6.596	2.163	5.393	1.923	4.637	1.545
Mobile	Locomotives	0.006	0.176	0.005	0.133	0.005	0.110
	Total	18.417	18.128	15.827	13.393	15.060	11.661

Planning Area 3- Knox and Lincoln Counties

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1 Hour Non-Attainment Area Demonstration							
Planning Area 4							
Hancock	09						
Waldo	27						
		all emissions expressed in tons per summer week day					
		2002	2002	2009	2009	2016	2016
Category	Subcategory	VOC	NOx	VOC	NOx	VOC	NOx
Point		1.366	2.207	0.510	0.370	0.600	0.430
Nonpoint		7.551	1.470	7.677	1.642	8.348	1.789
Mobile	Onroad	7.202	11.757	4.013	6.558	2.608	3.267
Mobile	Nonroad	7.906	2.691	6.680	2.361	5.580	1.798
Mobile	Locomotives	0.009	0.230	0.007	0.172	0.007	0.142
	Total	24.034	18.355	18.887	11.103	17.143	7.426

Planning Area 4- Hancock and Waldo Counties

Ambient Air Quality Monitoring

The maintenance plan for the 8-hour ozone standard must also include provisions for the operation of an ambient air quality modeling network to verify continued maintenance of the 8-hour ozone standard in each maintenance area. Maine is committing to the continued operation of an appropriate air quality monitoring network to verify continued maintenance of each area's attainment status in accordance with 40 CFR Part 58. Any proposed monitoring network modifications will be accompanied by technical and statistical analyses sufficient to document that a given monitor may be removed or relocated because it is unnecessary or duplicative. The final monitoring network design shall be subject to the approval of the EPA Regional Administrator.

Contingency Plan

The maintenance plan must include contingency provisions, as necessary, to promptly correct any NAAQS violation that occurs after redesignation of an area. It should include measures to be adopted, a schedule and procedures for adoption and implementation, and a specific time limit for action. Specific triggers that would put the plan into motion must be identified. This plan is considered to be an enforceable part of the SIP and should ensure that the contingency measures are adopted explicitly once they are triggered.

As required by the EPA redesignation guidance, a contingency measure, (a control program or set of controls), must be clearly defined and be implemented within a reasonable time frame if there is a lapse in attainment.

Despite the best efforts to demonstrate continued compliance with the 8-hour ozone NAAQS, the ambient ozone concentrations may exceed or violate the NAAQS.

Therefore, as required by section 175A of the Act, Maine has listed possible contingency measures in the event of a future ozone air quality problem. At the conclusion of each ozone season, the Maine DEP will evaluate whether the design value for the Midcoast nonattainment area is above or below the 8-hour ozone standard. If the design value is above the standard, the DEP will evaluate the potential causes of this design value increase. The DEP will examine whether this increase is due to an increase in local in-state emissions or an increase in upwind out-of-state emissions. If an increase in in-state emissions is determined to be a contributing factor to the design value increase, Maine will evaluate the projected in-state emissions for the ozone season in the following year. If in-state emissions are not expected to satisfactorily decrease in the following ozone season in order to mitigate the violation, Maine will implement one or more of the contingency measures listed in this section, or substitute a new VOC or NOx control measures to achieve additional in-state emissions reductions. The contingency measures(s) will be selected by the Governor or the Governor's designee within 6 months of the end of the ozone season for which contingency measures have been determined necessary. Possible contingency measures include:

<u>Adhesives</u>
Establish VOC content limits for industrial and commercial application of solvent-based adhesives and sealants based on California Air Resources Board (CARB) suggested RACT controls (1998).

<u>Asphalt Paving</u>
Reduce the VOC content limit for cutback asphalt from 5% to 4%, and lower current VOC content limits for emulsified asphalt by 20%.

<u>Automobile Refinish Coatings</u>
Adopt the VOC content limits captained in the Bay Area Air Quality Management District (BAAQMD) regulations.

<u>Consumer Products</u>
Adopt and implement the July 20, 2005 California Air Resources Board (CARB) regulations.

<u>Rule Effectiveness Improvement</u>
Increase enforcement of existing rules in order to increase rule effectiveness.

<u>Small Source Non-CTG VOC RACT</u>
Reduce the major source and Chapter 134 non-CTG VOC RACT applicability threshold from 40 to 10 tons per year of actual emissions.

<u>Conclusions</u>

Maine has met all section 110(a)(1) maintenance plan requirements to ensure that the 8-hour ozone NAAQS will continue to be maintained in all areas that were nonattainment areas or attainment areas with maintenance plans for former 1-hour ozone standard.

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Future emissions of VOC and NOx in each maintenance area will not exceed the 2002 attainment levels through at least 2016.